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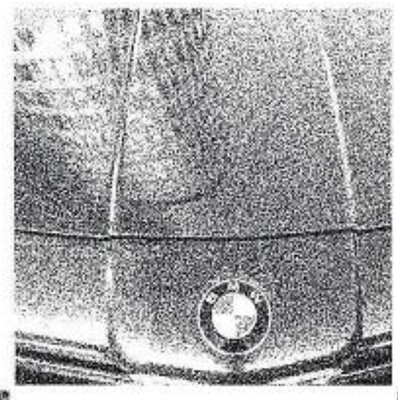

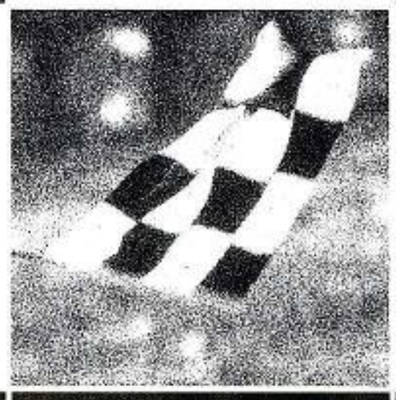

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BMW Programm 1988

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BMW 1988 model year

With the new 7 Series rounded off by the 750i/750iL flagship, the 3 Series fully revised and enlarged by the addition of some important new models, and the classic 6 Series coupé updated to the latest standard, BMW's entire model range has reached a new climax. The 5 Series, which has now proven its merits for no less than 6 years, has also retained its popularity in the market and is still in great demand from customers.

Without doubt, the introduction of the 12-cylinder 7 Series and the new, revised 3 Series represents the absolute highlight in BMW's 1988 model range.

The new 7 Series, which has established itself in a high position in the luxury market ever since its launch in autumn 1986, now gains immense additional appeal through the first German 12-cylinder in almost 50 years. The share of the 750i/750iL in overall 7 Series sales will be approximately 20 %, that is almost 10,000 units a year.

Important additions to the compact 3 Series are the 316i with fuel injection, the brand new 318i 4-cylinder, the dynamic 324td turbo-diesel, the 320i Convertible and the 324td, 320i, 325i and 325iX (4-wheel drive) touring following in the footsteps of its predecessor in the 70's.

With these modifications, BMW's range of fuel injection and catalytic converter models extends from the 316i to the 750i. This will show everybody once and for all that sheer driving pleasure and environmental care do indeed go together.

The BMW 3 Series

4-cylinder	BMW 316i	with catalyst
	BMW 318i	with catalyst
	BMW M 3	with catalyst (16-valve engine)
6-cylinder	BMW 320i	with catalyst
	BMW 320i Convertible	with catalyst
	BMW 320i touring	with catalyst
	BMW 324d	
	BMW 324td	
	BMW 324td touring	
	BMW 325i	with catalyst
	BMW 325iX	with catalyst
	BMW 325i Convertible	with catalyst
	BMW 325i touring	with catalyst
	BMW 325iX touring	with catalyst

Featuring a brand new, ultra-modern 4-cylinder injection engine with the latest technical features, a turbo-diesel (the first ever with electronic fuel injection) that sets new standards in terms of dynamism and performance, the reinstated touring model and a wide range of refinements throughout the entire range, the BMW 3 Series looks extremely good in the 1988 model year.

Having already offered the individualist a wide range of choice in the past (with the four-wheel drive, the "small" diesel, the Convertible and the M 3), the white-and-blue compact range now has even more to offer with a host of new models in the year to come.

In the German market the entire 3 Series (with the exception of the M 3) will be available exclusively with catalytic converter (or prepared for subsequent installation of a catalyst).

As of the 1988 production year, the BMW 3 Series comprises the following models:

- 316i with 1.8-litre injection engine developing 75 kW/102 bhp (77 kW/105 bhp without catalytic converter)
- 318i with the new 1.8-litre four-cylinder injection engine developing 83 kW/113 bhp (85 kW/115 bhp without catalytic converter)
- 324d with 2.4-litre normal-aspiration diesel developing 63 kW/86 bhp
- 324td and 324td touring with 2.4-litre turbocharged diesel developing 85 kW/115 bhp
- 320i, 320i touring and 320i Convertible with 2.0-litre 6-cylinder inline engine developing 95 kW/129 bhp (with and without catalytic converter)
- 325i, 325i touring, 325i Convertible, 325iX (four-wheel drive) and 325iX touring with 2.5-litre 6-cylinder engine developing 125 kW/170 bhp (without catalytic converter 126 kW/171 bhp)
- M3 with 16-valve four-cylinder 2.3-litre engine developing 143 kW/195 bhp (without catalytic converter 147 kW/200 bhp)

The new touring will therefore be available in four versions: 320i and 325i, 325iX (with catalytic converter only) and 324td. The 325i Convertible will be supplemented by the 320i with a soft roof; further new features are additional colours for the roof and the interior as well as light-alloy wheels on the 325i Convertible.

The various models with and without catalytic converter have either exactly the same or almost the same engine output. As a result of a definite shift in demand from the 325e to the 320i catalyst/325i catalyst, the "eta" model in the 3 Series is no longer in production.

In improving the general standard of all 3 Series models BMW sought above all to include various technical achievements so far reserved mainly for the new 7 Series.

At a glance, these new highlights are as follows:

- New plastic bumpers like on the 7 Series to ensure that minor impacts up to 4 km/h do not cause any damage; the convertible and M3 will remain unchanged, particularly as the M3 has already fulfilled this requirement in the past.

- An important objective in updating the 3 Series was to achieve an even higher standard of functionality and passive safety. In addition to the extra safety provided by the new bumpers, the cost of repair in the event of an impact is reduced considerably and passenger safety is maintained at the highest and strictest standard worldwide (35 mph or 56 km/h as a voluntary standard in the USA).

- Over and above these two improvements, the ellipsoid-technology low-beam headlights and foglamps taken over from the 7 Series (with a suitable modification of the foglamps) provide a substantial increase in driving safety. For reasons of space, the M3 and the Convertible are still fitted with conventional foglamps.

- The 320i, 325i and 325iX (including the touring models) feature a new 64-litre (Convertible: 62-litre) fuel tank replacing the old 55-litre tank.

- Like all 325i and 324td models, the 320i now comes with twin-sleeve gas pressure shock absorbers.

- In conjunction with the new bumpers, new front and rear spoilers, extra-large new rear lights (with even better visibility) and a new panel between the rear lights, deeper rear-wheel cutouts, blacked-out windscreen, rear and side window frames and rubber side strips give the 3 Series models their new, characteristic looks.

- All 325i models and the M3 are fitted as standard with central locking.

The new four-cylinder engine provides a significant improvement over its successful predecessor (which has been featured in BMW cars in constantly refined form since 1962) not only in terms of running smoothness and low noise, quality, reliability and all-round dependability. It also complies with the world's strictest emission rules and combines future-oriented ease of service with a reduction in maintenance requirements. Incorporating Motronic III like the 7 Series, the new engine improves on its predecessor in terms of power, performance and fuel economy.

Featuring the improved 6-cylinder turbo-diesel that has already proven its dynamic merits in the 524td, the 324td offers a new standard of performance in the compact turbo-diesel range. Together with the introduction of the turbo-diesel in the 3 Series, BMW is also introducing Digital Diesel Electronics, a completely new electronic control system. The fittings and appointments of the 324td are of the same standard as with the 320i.

The touring is not intended to be a utility vehicle, but rather represents an entirely new model in the 3 Series with the emphasis on sportiness, dynamism and handling. These features are then skilfully combined with an enhanced standard of leisure-time versatility. Unlike its predecessor in the 70's, the new touring is based on a four-door model.

In conceiving the styling of the new car, BMW's designers have attached great importance to giving the touring a genuine sports appeal - an aspect reflected by the elegantly raked rear hatch. The rear seat can be subdivided and folded down completely, the rear loading shelf is deliberately limited to the space between the rear lights in order to combine easy loading of heavy objects with an equally good possibility of lashing down the luggage being transported. The fittings and appointments of the touring reflect the car's sporting characteristics, including items such as BMW light-alloy wheels, central locking, two rear-view mirrors in body colour, satin-chrome finish, green heat-insulating glass and black side-sill covers.

It is well known that the BMW 3 Series introduced in 1975 as the successor to the legendary 02 Series is the original car in its class: The car that first introduced and established the compact sports class.

Just how close the 3 Series now comes toBMW's top models in the larger series in both technological and qualitative terms, is shown by the fact that these cars are fitted as standard with Motronic and L-Jetronic, overrun control, Service Interval Indicator, Energy Control and Check/Control. The M3 and the various 325i models even come as standard with ABS, the on-board computer and airbag being available as options.

BMW 316i catalyst

In the 1988 model year the BMW 316i comes for the first time with a 1.8-litre injection engine and catalytic converter developing 75 kW/102 bhp (77 kW/105 bhp without catalytic converter). Accordingly, BMW's range of models with fuel injection and lambda-controlled catalytic converter now extends from the 316i right to the very top. The 316i offers outstanding performance for a car of its class: acceleration to 100 km/h in 12.1 sec and a top speed of 182 km/h (113 mph). With a share of more than 50 % in the four-cylinder 3 Series and 16 % in the total range of 3 Series models, the 316i is a very important car for BMW in terms of volume.

BMW 318i catalyst

Featuring a brand new four-cylinder power unit (cf separate section), the 318i offers even better performance: It accelerates to 100 km/h in just 10.8 sec and has a top speed of 188 km/h (117 mph), making it a very fast car on our roads. In terms of motoring refinement and low noise, quality, reliability and all-round dependability, the new engine sets the standard in its category. It also complies with the strictest emission regulations anywhere in the world, at the same time combining future-oriented ease of service with a further reduction in the amount of maintenance required. Featuring Motronic III engine control that has already proven its merits in the new 7 Series, the power unit of the BMW 318i catalyst develops 83 kW/113 bhp (84 kW/115 bhp without catalyst).

BMW 324d (diesel)

The diesel model so important in this day and age already makes up almost 20 % of the total production of the BMW 3 Series. It offers superior power and performance with an output of 63 kW/86 bhp at 4600 rpm. The maximum torque is 152 Nm (112 ft/lb) at 2500 rpm. With a top speed of 165 km/h (102 mph), the 324d accelerates to 100 km/h in 16.1 sec. So even without a turbocharger this normal-aspiration diesel offers substantial performance.

The 324d represents an important extension of BMW's diesel line. Based on the power unit of the 524td but without turbocharger, this 6-cylinder inline engine offers the sophisticated motoring refinement, performance, economy, quality and long running life of a genuine BMW power unit. With the complete encapsulation of the engine compartment and all-round sound deadening on the body, the 324d also provides a remarkably low noise level inside the passenger compartment.

Through the 324d BMW has established a milestone in progressive technology. A diesel in technical terms, it offers the kind of performance you normally only get from a petrol-engined car.

BMW 324td

Taking over the improved 6-cylinder turbo-diesel from the 524td already renowned for its dynamism, the BMW 324td becomes the first car ever to feature Digital Diesel Electronics. Powered by 85 kW/115 bhp, the 324td accelerates to 100 km/h in 11.9 sec and has a top speed of no less than 187 km/h (116 mph). This makes it one of the very fastest diesels anywhere, fully equal to even the most dynamic and agile compact saloons with a petrol engine. The 324td will also be available as a touring version.

BMW 320i catalyst

With the BMW 320i, purchasers enter the BMW range of 6-cylinder petrol-engined models - cars which have made a great name for themselves worldwide in terms of motoring refinement and performance. With an output of 95 kW/129 bhp (with and without catalytic converter), the BMW 320i accelerates to 100 km/h in 10.6 sec and has a top speed of 197 km/h (122 mph). It is therefore the ideal car for the enthusiast looking for an agile and dynamic compact saloon, absolutely perfect for the driver who does not want the large dimensions, but certainly does appreciate the performance and features of an upmarket automobile.

Taking into account the great popularity of the 320i, this car is now available also as a Convertible (same features as the 325i Convertible, ABS available as an option) and will soon be introduced in touring form.

BMW 325i catalyst

The silky-smooth and extra-powerful straight-six power unit of the 325i (125 kW/170 bhp with catalytic converter, 126 kW/171 bhp without) is now available in five different models: as a saloon (naturally with a choice of two or four doors), as a Convertible, with four-wheel drive, as the touring (see separate section) and as a four-wheel drive touring. So every motorist will certainly find his ideal car in this range.

A few technical details:
The 125 kW/170 bhp (126 kW/171 bhp without catalytic converter) power unit is based on BMW's "small" 6-cylinder series. The main objectives in designing this engine were to achieve supreme performance and motoring refinement, a high standard of fuel economy and clean emissions through the catalytic converter.

The substantial torque of the engine provides the essential prerequisite for even greater reliability, performance and a longer running life. The steering features a variable transmission ratio reducing steering forces with an increasing wheel lock. ABS fitted as standard and the BMW airbag available as an option round off the complete range of features of this high-performance soloon.

As the top model in the series, the BMW 325i offers the optimum standard of motoring in the compact range, thus appealing both to the down-to-earth advocate of understatement and to the genuine enthusiast. It is the ideal car for both.

As an option the 325i models are available with 4-speed automatic transmission with and without electronic/hydraulic control.

BMW 325iX catalyst

The BMW 325iX is a consistently designed concept without compromises: High performance with 4-wheel drive combined as standard with ABS and power-assisted steering. This compact 4x4 within the 3 Series features permanent 4-wheel drive with asymmetric distribution of engine power: 37 % goes to the front, 63 % to the rear axle. This reduces the influence of engine power on the steering and keeps the car easy to control when driving to the limit.

The smooth and powerful 2.5-ltr engine provides a perfect match for the permanent 4-wheel drive. The 170 bhp (125 kW) of the 6-cylinder catalyst

engine combined with 4-wheel drive proves that it is not only the good idea that counts, but rather the perfect all-round solution. So let us quote Rauno Aaltonen, the chief instructor of the BMW driver training courses, in this context: "Compared with all the 2-wheel and 4-wheel-drive concepts known to us so far, the 325iX offers incomparably good handling when driven to the utmost limit."

Viscous locks automatically prevent the wheels from spinning, thus making things much easier for the driver particularly in extreme situations. And BMW's engineers would never accept a 4-wheel drive without ABS. In this case, therefore, the ABS anti-lock braking system has been modified especially for 4-wheel drive and works perfectly in all situations. In conjunction with the asymmetric distribution of engine power (37 % at the front, 63 % at the rear), this provides extremely well-balanced handling and roadholding. With a slight oversteer when driven to the limit this ensures that drivers owning several BMWs, for example, are not faced with a different kind of handling each time they change cars.

Some further technical details:
Both the body and the suspension had to be modified for this special type of 4-wheel drive. The new front axle support, for example, is made of cast aluminium, the spring struts rest on new supports in the wheel arches (which creates a slightly negative steering roll radius), the standard power-assisted steering has been moved to the front, the track is wider and the front axle drive higher up (which increases ground clearance by about 30 mm/1.2"). The side-sills are wider, the wheel cutouts larger and, together with the discreet rear spoiler, all these additional components are painted in the same colour as the car itself.

The 325iX is available with either two or four doors and with automatic transmission with/without EH control.

BMW 325i Convertible catalyst

Following an old tradition, BMW once again offers a genuine convertible. "Genuine" means that this car is completely open; its styling is not impaired by a rollover bar. This two-door, four-seater convertible is therefore a very attractive and, indeed, a beautiful car designed to satisfy even the most aesthetic connoisseur.

The roof folds quickly and easily into the tailor-made rear roof compartment, thus providing full visibility to the rear for example when backing up. Even ladies will find it easy to lower or raise the roof, without having to operate any catches or brackets and without running the risk of hurting one's fingers: Just open two levers on the windscreen frame and everything else will happen quite automatically. The roof closes very tightly to keep out dirt and dust and a safety mechanism ensures that the rear roof compartment and luggage compartment cannot be opened at the same time by mistake. The roof is also very easy to close without requiring any kind of effort.

Also in view of its superior power and performance - 125 kW/170 bhp -, the four-seater 325i Convertible catalyst has a specially reinforced floor assembly to provide optimum strength and rigidity.

The BMW 325i Convertible comes as standard with electric window lifts for the fully retractable front and rear windows, sports seats and a rear-view mirror on the front passenger's door.

Motoring with the roof down is not just a thrilling experience for many enthusiasts but even a way of life. And the BMW 325i Convertible gives these open-air fans genuine and useful flair further enhanced by outstanding performance. This car, therefore, is far more than a mere means of transport. It is a car that offers a world of emotions without making any compromises in terms of quality and functions. In brief, the 325i Convertible offers all the ingredients for a fascinating, efficient, safe and refined style of motoring.

The BMW Convertible offers outstanding performance comparable with any other convertible in the market. With its silky-smooth 6-cylinder engine developing 125 kW/170 bhp, the Convertible accelerates to 100 km/h (62 mph) in just 8.7 sec and has a top speed of 216 km/h (134 mph) - if you really want to go this fast in an open car. A very important feature, particularly for a convertible, is pulling force and engine flexibility in direct gear: the BMW Convertible accelerates from 80 to 120 km/h (50 - 75 mph) in direct gear in just 9.5 sec. Considering that the open-air motorist will feel really at home at 80 km/h, overtaking is fast, safe and simple as engine power available at all times.

But not only performance is a No 1 priority - particular attention has also been given to motoring comfort. The sports seats and electric window lifts fitted as standard, the instrument panel curved around the driver with the clearly arranged instruments, and the conveniently accessible controls and levers provide the open-air enthusiast with a unique dimension of BMW quality: The thrill of fresh-air motoring at its very best for young and young-at-heart enthusiasts.

Developing the BMW 325i Convertible, BMW's engineers had to reinforce and modify the bodyshell to provide a high standard of all-round stability under all driving conditions even without a fixed roof, at the same time maintaining the exterior dimensions and contours of the 325i saloon to the greatest possible extent. To reach this supreme objective BMW's body engineers have introduced a large number of design improvements and carried out a wide range of tests.

In designing the exterior styling of the new Convertible, BMW's engineers have given particular attention to achieving a high standard of all-round harmony and elegance marred neither by a roof "hump" nor by a rollover bar.

The passenger compartment is just as long inside as with the saloon. Interior width on the rear seats, on the other hand, is somewhat smaller than with the saloon due to the space taken up by the roof assembly. There

is nevertheless enough space at the rear for two full-size individual seats.

The BMW 325i Convertible comes as standard with sports seats adjustable for height, angle, fore-and-aft position and thigh support.

When closed the soft roof offers the same perfect protection as the standard saloon roof.

The novel roof assembly enables just one person by himself to open and close the soft roof quickly and without the slightest effort.

A completely new feature of the roof assembly is the top-dead-centre kinematic system where the rear bar is automatically lowered by forced control: Incorporating special control bars, the top-dead-centre kinematic system tensions the rear roof bar and, accordingly, the rear window section, making them fit watertight on the body. As a result no mechanical locks or fastening clamps are required at the rear to keep the roof tight around the rear window. The roof automatically rests on the body absolutely watertight and without any draughts.

The large green-tinted rear window is made of scratch-proof, flexible and weather-proof artificial glass. It is sewn into the roof and additionally fused onto the fabric. The rear-window park cover provided as standard ensures good visibility to the rear in the winter, relieving the driver of the need to remove ice and snow by hand.

A warm-air blower is integrated in the parcel shelf behind the rear seat backrest for ventilating and defrosting the polyglass rear window, the blower itself being operated by the rear window heater switch. To make sure that the heater blower cannot be switched on when the car is open a micro-switch on the roof assembly bars automatically interrupts the power flow with the roof down.

A hardtop will also be available as an option from autumn 1987: Weighing only 27 kg, this extremely stable hard roof in glass-fibre-reinforced sandwich design (available in black and beige) fits exactly on to the frame by means of just four rapid catches (two at the front and two at the back).

The hardtop comes as standard with a heated glass rear window, the wiring for which has been installed in all Convertibles since the start of production. Another additional feature is a special envelope for stowing away the soft roof in winter.

On account of the roof stowage compartment new hinges and opening aids had to be provided for the luggage compartment lid, gas-pressure springs being used instead of the usual torsion bar springs. The luggage compartment lid itself is exactly the same as on the saloon.

The bodyshell reinforcements and additional fittings described above obviously mean extra weight: The bodyshell as such weighs an extra 90 kg (198 lb), the overall weight of the vehicle exceeding that of the saloon by approximately 130 kg (287 lb). This includes the electric window lifts and sports seats fitted as standard on the Convertible.

The chassis and suspension of the BMW 325i Convertible has also been adjusted to cope with the extra weight and specific requirements of motoring with a soft top. Indeed, the new chassis and suspension concept - softer springs and harder shock absorbers - further underlines the all-round harmony of this new Convertible together with the powerful 170 bhp 6-cylinder engine.

BMW M 3 catalyst

The top model in the BMW 3 Series is the M 3 with a 2.3-ltr 16-valve 4-cylinder engine developing no less than 143 kW/195 bhp with catalytic converter (and 147 kW/200 bhp without catalyst). Featuring dynamically flared wheel arches, door-sills, rear and front air dams and an extra-sloped rakish rear window, this road racer is perfectly designed and fully equipped for motorsport - starting with the 4-valve/cylinder head and ranging to the extra-wide wheel arches designed to accommodate 10" wheels in race trim.

The BMW M 3 is far more than a 3 Series with extra power. Rather, it is a unique car conceived and designed on the basis of the 3 Series and the first BMW ever to be developed by BMW Motorsport GmbH and produced by BMW AG.

To give this saloon cum racing car the right kind of power, the engineers of BMW Motorsport GmbH used a design concept that has already proven its merits with BMW: the four-valve per cylinder concept.

Right from the outset, therefore, the emphasis in developing the entire car and designing the chassis and suspension was on motorsport.

In designing the body of the car, BMW's stylists concentrated on racing functions and not on visual - and flashy - tuning: The widely flared wheel arches contributing to the dynamic looks of the M 3 provide ample space for accommodating 10" wheels allowed by Group A regulations as the maximum for cars up to 2500 cc.

Some of the significant features that distinguish the styling of the M 3 from the "normal" BMW 3 Series are the front and rear air dam, the rear wing and the rear window area with the modified rake of the rear window - all carefully designed improvements to optimize streamlining and reduce

lift on the front and rear axles. Obviously, these improvements are beneficial not only to the racing driver but also to the reserves the M 3 is able to offer in everyday motoring.

The same applies to the chassis and suspension to which BMW's engineers have given maximum attention: The special sports tuning of all chassis components, the lowered suspension with a new front axle geometry, the more direct power steering and the highly efficient brakes fitted as standard with ABS provide optimum conditions for fast but safe driving. The BMW M 3 comes as standard with extra-wide 205/55 tyres on 15" wheels (optional: 225/45 tyres on 16" wheels).

It also goes without saying that the interior of the M 3 reflects the outstanding character of a high-performance saloon. Just three examples are the BMW sports seats at the front, individual body-contoured seats at the rear and modified instruments to reflect the car's higher road and engine speeds.

The BMW M 3 - a compact high-performance saloon designed for sheer driving pleasure and destined for racing success. In the words of Wolfgang Peter Flohr, Chairman of BMW Motorsport GmbH, "this is a sports car within the financial reach of private racing drivers and with sophisticated, but straightforward and unproblematic technical features". The racing version of the M 3 will be entered above all in national and international championships where this car will be setting out on the road to success in the engine category up to 2500 cc.

The 2.3-ltr straight-four power unit of the M 3 is a synthesis of racing experience on the one hand and expertise in building four and six-cylinder engines on the other. The cylinder head is directly related to the original cylinder head of the 6-cylinder M 1 which lives on in refined form in the M 635 CSi and M 5.

The decision to use a four-cylinder power unit in the M 3 is also based on experience in motorsport. Thanks to the relatively short crankshaft compared with a straight-six engine, this design offers higher engine speeds for the specific demands of motor racing. The objective, after all, is to keep flexural and torsional vibrations on the crankshaft as small as possible at engine speeds in the range of 10,000 rpm (which are quite common in racing).

The new BMW M 3 proves convincingly that high-performance motoring and environmental care need not preclude each other.

The catalyst version of the BMW M 3 develops 143 kW/195 bhp at 6750 rpm. The maximum torque of 230 Nm (170 ft/lb) comes at 4750 rpm. With this kind of power, the BMW M 3 equipped with catalytic converter accelerates to 100 km/h (62 mph) in 6.9 sec, requires just 7.5 sec from 80 - 120 km/h (50 - 75 mph) in 4th gear and has a top speed of 230 km/h (143 mph). The M 3 without catalyst develops 147 kW/200 bhp at 6750 rpm and a maximum torque of 240 Nm (177 ft/lb) at 4750 rpm.

The BMW M 3 catalyst runs on unleaded premium fuel with an octane rating of 95 (although the Motronic control unit can be set to 92 octane unleaded regular-grade fuel). The model without catalytic converter requires 98 octane premium-grade and may also be subsequently retrofitted with a catalyst simply by adjusting the control unit.

From the 1988 model year, the BMW M 3 will be available as an option with variable suspension developed by BMW Motorsport GmbH in cooperation with Boge.

The new BMW four-cylinder engine

The great success of BMW's 1500, 1800 and 2000-cc cars in the 60's was largely attributable to the progressive concept of BMW's four-cylinder power units introduced at the time. Indeed, it was this very concept that provided the basis for the first-ever turbocharged engine to win the Formula 1 World Championship and the very successful 2.3-litre 16-valve four-cylinder power unit now featured in the BMW M 3.

After a life-cycle of more than 25 years, however, the time had come to replace this generation of power units by a new four-cylinder engine with even better and more sophisticated functions.

The technical features of BMW's new four-cylinder engine

In developing the new engine BMW's engineers concentrated on the following technical objectives:

- To improve torque throughout the entire engine speed range while at the same time increasing the output of the engine
- To fulfill the world's strictest emission standards while at the same time enabling the engine to run on all standardised fuel grades
- To achieve optimum motoring comfort through excellent running refinement, sound-deadening and accelerator response
- To build an engine with a long running life, optimum reliability and trouble-free running characteristics
- To achieve a high standard of economy through fuel efficiency and future-oriented ease of service

- To make the engine both compact and light, thus fitting perfectly into existing and future vehicles

- To give the engine attractive looks and styling

As a result of this development BMW now proudly presents a brand new 1.8-litre four-cylinder engine with truly outstanding technical features.

In accordance with German Industrial Standard DIN 70020-A the entire engine weighs a mere 132 kg or 291 lb. Engine output with catalytic converter is 83 kW (113 bhp) at 5500 rpm. The engine without catalytic converter develops an extra 2 kW. The specific output of 46.2 kW/ltr in catalyst trim is a record figure in this category. The maximum torque of 162 Nm (119 ft/lb) at 4250 rpm equals 91.9 Nm (67.7 ft/lb) per litre and also exceeds the torque achieved on average by other comparable catalyst engines.

This new BMW engine also sets new standards in its class in terms of motoring refinement and low noise, just as it provides a unique balance of performance and fuel efficiency.

These objectives have been reached through the use of the most advanced technologies, some of which were first introduced with BMW's progressive new 12-cylinder power unit or with the new 7 Series.

Description of individual components and features

Crankcase

The crankcase is a completely new development and is made of perlitic grey-cast iron. The most important dimensions are as follows:

- Bore 84 mm (3.31")
- Spacing between cylinders 91 mm (3.58")
- Overall length of crankcase 387 mm (15.24")

Using the most advanced methods of calculation and examination as well as modal analysis, BMW's engineers are able to build the engine with new design features and light-alloy casting procedures. Forces from the cylinder head bolts are transmitted directly to the crankcase without any strain or tension, small water cavities enable the engine to warm up quickly and efficiently (the total volume of water in the crankcase is only 1.2 ltr). All attachment points for the engine supports and ancillary units are on rigid, specially reinforced components. As a result, the crankcase weighs a mere 30 kg (66 lb) despite its higher rigidity and lower noise emissions.

Crankshaft

The crankshaft made of spheroidal cast iron runs in five bearings and has 8 counterweights. The stroke is 81 mm (3.19"). The main bearing shells are made of aluminium and come in three different dimension categories in order to compensate any tolerances (a highly sophisticated procedure in terms of production). Inter alia, this gives each and every engine optimum, highly accurate and close gearing tolerance and thus ensures smooth running at all times.

Pistons

Like on BMW's 12-cylinder power unit, the pistons feature a flat trough on the surface extending eccentrically down to the spark plug. Forming part of the combustion chamber, they help to make the chamber very compact. This, in turn, provides short flame travel and complete combustion of the fuel/air mixture, ensuring a high degree of efficiency and, as a result, good fuel economy.

The torsional vibration damper on the front end of the crankshaft and the flywheel on the drive shaft are also new developments carefully matched to provide optimum weight conditions. This ensures a smooth torque curve and helps to give the engine a high standard of running refinement and a very low noise level.

Cylinder head

A completely new development, the cylinder head has largely the same features as those of BMW's 12-cylinder engine.

The well-known crossflow principle with a small valve angle of 14^{o} provides a steep arrangement of the intake duct with only minimum diversion to the valve seat. This new cylinder head concept in conjunction with the new pistons minimises friction and flow losses, ensuring a good cylinder charge and, accordingly, a high degree of running efficiency.

The overhead camshaft runs in five bearings in the cylinder head and is driven via a toothed belt. Valve drive is by rocker arms with hydraulic compensation of valve clearance. It does not require any maintenance.

Intake air flow

The intake air silencer with air filter, air volume meter and intake funnel is mounted on the body of the car. The throttle butterfly manifold is fitted on the middle of the aluminium air collector, the manifolds themselves are all of equal length. Idle speed is controlled by a bypass line on the throttle butterfly in conjunction with a rotating adjuster (which, in turn, is controlled by the electronic engine management system). This means that the engine idle speed will remain constant under all running conditions.

The injection jets are integrated in the intake manifold right in front of the cylinder head. Fuel is injected directly towards the intake valves in order to provide a good fuel/air mixture.

Exhaust

The exhaust ducts from cylinders 1 + 4 and 2 + 3 come together in the exhaust manifold where they form two separate exhaust pipes. The two exhaust pipes at the front are made of stainless steel and merge into one pipe shortly upstream of the catalytic converter. The pre-muffler is integrated in the housing of the three-way catalytic converter with a monolith cross-section measuring 118.6 cm^2. The lambda probe is integrated in an intermediate pipe linking the two front exhaust manifolds.

The large cross-section of the exhaust system in conjunction with the carefully matched intake manifolds, valve drive and exhaust helps to give the engine its smooth and consistent torque curve (90 % of the maximum torque is available in the speed range between 2200 and 5500 rpm).

Engine electronics

The new four-cylinder BMW engine features the very latest third-generation Motronic. This highly sophisticated engine management system has exactly the same functions as with the new BMW 7 Series.

These are:

- grid-controlled ignition
- grid-controlled fuel injection
- maintenance of a fuel/air mixture of $\lambda = 1$ for efficient use of the catalytic converter, allowance being made for the fuel evaporation filter system fitted as standard
- heated λ probe
- idle speed control in accordance with the engine's specific running

parameters (including wear), running conditions and temperature

- self-diagnosis, defect memory and failsafe running programme

With this new generation of Motronic engine management, exactly the same engine control unit can be used for all types of engines. All one has to do is activate the optimum control grid via a code for the different versions with catalytic converter, prepared for subsequent installation of a catalytic converter, or without catalytic converter. The control unit is a single-chip printed circuit board, the number of components has been reduced by a further 40 %.

Oil circuit

The oil filter fitted on the side of the timing gear case and accessible from above helps to give the new BMW engine optimum ease of service. The oil quantity including the filter is 4 litres.

Suitable design measures throughout the entire oil circuit (such as the oil reflow ducts extending down to the oil sump and additional ducts serving to calm the oil) minimise the foaming effect and thus improve the efficiency of the hydraulic valve drive.

Coolant circuit

The coolant flows in longitudinal direction through the crankcase and cylinder head. Coolant flow openings in the gasket ensure a consistent distribution of temperature in the crankcase and cylinder head, the amount of coolant of both the engine and heating system being reduced to a mere 6 litres through various design measures such as the joint casting of the cylinders. This, in turn, helps the engine to warm up quickly and thus further increases the running life of the engine.

Ancillary drive system

To ensure a simple arrangement of the power steering pump and air conditioning compressor both available as an option, the ancillary units are driven by low-maintenance V-belts on three different levels. The alternator and water pump are driven by one and the same belt.

To reduce noise to a minimum, the power steering pump and air conditioning compressor are fastened rigidly to the engine and are driven by separate V-belts.

Digital Diesel Electronics (DDE), a fully electronic diesel injection system

As a pioneer in automotive electronics, BMW has the objective to optimise the diesel engine for use in passenger cars, particularly when it comes to overall economy, performance, environmental compatibility and motoring refinement. In cooperation with BOSCH, BMW has therefore developed electronic diesel injection for the 2.4-ltr 6-cylinder turbo-diesel, providing unprecedented accuracy and efficiency.

The objectives in introducing this electronic diesel injection control system are as follows:

- To achieve adaptive engine control, ie, a control system that adjusts to running conditions and therefore ensures consistent accuracy throughout the entire running life of the engine
- To give the control system a high standard of flexibility for a wide range of vehicle requirements (national versions and specifications)
- To obtain a diagnostic facility through the permanent supervision of all engine functions, as with Motronic III

Description of the system

To make sure that the engine provides an optimum combination of performance, running refinement, low noise, fuel economy and clean exhaust emissions, the following control functions must be electronically supervised:

- injection volume
- start of injection
- turbocharger pressure
- safety functions

The system components may be split up into three groups: sensors, the control unit and adjusters.

The sensors featured by DDE are as follows:

- Potentiometer for the accelerator position
- Potentiometer for the control valve in the injection pump
- Engine speed sensor
- Start of injection sensor
- Turbocharger pressure (absolute pressure) sensor
- Temperature sensor for air, coolant and fuel
- Road speed sensor
- Switch sensors for the brakes, clutch and air conditioning

The control unit has two high-performance microprocessors for processing the sensor signals and comparing them with the target data stored in the "brain". Using control lines and grids, computer programmes determine the current running conditions and generate the appropriate control data for the adjusters.

The start of fuel injection and exhaust gas recirculation are controlled by electric magnets, a rotating magnet adjuster controls the injection volume and an electro-pneumatic converter maintains the appropriate turbocharger pressure.

Description of functions

Injection volume control

The injection volume is controlled by an electromagnetic rotating adjuster acting on the injection pump control valve and, accordingly, changing the pump stroke as required. A potentiometer determines the position of the valve and enables the control unit to compare that position with the target data.

The following control functions are provided in this way:

- Starting volume control in accordance with engine and fuel temperature

- Idle speed control for maintaining the lowest possible idle speed regardless of engine temperature and any power-consuming items that might be switched on

- Driving control designed to combine optimum output and performance with optimum fuel economy and clean exhaust emissions; exhaust fumes are limited by means of volume control as a function of turbocharger pressure and engine speed

- Running smoothness control serving to minimise any inequality in running conditions by exactly metering the amount of fuel supplied to each cylinder

- Active surge control preventing the control circuit from developing inherent vibration when the accelerator is suddenly depressed, and thus avoiding any surge or studder effect; for this purpose the engine speed signal (angular acceleration) is applied for adjusting the injection volume

- Engine overheating control which reduces the injection volume as soon as the highest admissable coolant temperature is exceeded

Injection start control

Again following a comparison of target and actual data by the control unit, a magnetic valve in the injection adjuster serves to set the injection starting point exactly to the engine's current running requirements.

Turbocharger pressure control

The turbocharger pressure determined by a pressure sensor on the engine is compared with the target figure stored in the computer and, if necessary, corrected via the electro-pneumatic converter by opening the bypass butterfly.

Turbocharger pressure control serves to avoid high engine drag forces under an abrupt change in engine load.

Safety functions

The following measures serve to guarantee the basic functions required in detecting deficiencies in the system:

- Feasibility checks of the system components and their functions
- Failsafe operation with redundant components or self-generated ancillary data
- Storage of deficiencies in the memory and diagnostic function

Particularly important components highly relevant to safety are the accelerator pedal sensor, the engine speed sensor, microprocessor and injection volume control. All information and system responses are checked several times for feasibility.

As soon as one running requirement is no longer fulfilled, the system determines that the engine must be run under failsafe conditions, meaning that the idle speed will be increased accordingly. This keeps the vehicle manoeuvrable and in proper driving condition.

The diagnosis facility is an important improvement for the flawless operation of a diesel engine. Trouble-shooting is facilitated by storing all deficiencies (even deficiencies not noticed by the driver) in a defect memory, thus providing information for subsequent retrieval.

Effects of Digital Diesel Electronics (DDE) on running conditions

Engine

Electronic control and engine management serves to optimise

- fuel economy
- engine output and torque
- exhaust emissions.

The reduction in fuel consumption (which, particularly under part load, is up to 4 % versus mechanical engine control) is attributable to the fact that the fuel injection starting point may be accurately retarded as a function of load.

Exhaust emissions have been further reduced by the grid control of injection start and exhaust gas recirculation. Accordingly, the engine generates far less emisssions both when starting cold, under part and full load. This high standard of control accuracy remains unchanged throughout the vehicle's running life, as it actively adjusts to actual running conditions. It also helps to reduce the effect of deviating production tolerances on the engine's running characteristics.

Vehicle functions

Electronic diesel injection control provides a substantial improvement of functions and motoring comfort in a passenger car.

- Injection volume and engine speed control ensure good cold starting characteristics and keep the engine running smoothly and reliably

- Active vibration damping eliminates annoying vehicle vibration along the longitudinal axis when abruptly accelerating from part load

- Engine smoothness control balancing any inequality in running speed effectively suppresses engine vibration when idling

- Engine drag control "softens" the response of the vehicle when abruptly letting go the accelerator (this is done by rapid turbocharger control)

Conclusions

Introducing electronic diesel injection control, BMW is taking an important step into the future in the technology of the turbo-diesel. This gives the diesel new benefits so far forfeited by mechanical injection control due to its inadequate potential. Electronic fuel injection control provides a significant improvement in diesel motoring in terms of exhaust emissions and fuel economy, noise control and motoring refinement.

Digital Diesel Electronics will be introduced in BMW's 1988 models and will be presented for the first time on the occasion of the Frankfurt Motor Show.

The BMW touring

- a new, sporting and elegant version within the BMW 3 Series

Introducing the new touring model, BMW is presenting a high-performance sports estate for the second time in the compact range following the 02 touring produced in the 70's.

Like its predecessor, the new touring is not conceived as a utility vehicle but rather provides an entirely new possibility of combining the renowned characteristics of the 3 Series such as sportiness, dynamism and excellent handling with enhanced practical leisure-time value.

The four-door 3 Series saloon has therefore been converted into a hatchback with a versatile luggage compartment variable in size from 370 to 1125 litres in accordance with the German VDA standard.

Without changing the essential styling features of the 3 Series, the new rear end blends harmoniously into the overall proportions of the vehicle. The external dimensions and wheelbase are exactly the same as on the saloon. The overall impression of sportiness typical of a BMW is further accentuated by the rake of the rear roof pillars and the hatchback in conjunction with the typical counter-rake of the D-pillar.

Inside the car one will be impressed immediately by the clear-cut, uncluttered luggage compartment fully carpeted all round.

The touring is available both with BMW's 2.0 and 2.5-litre injection engines and with the 2.4-litre turbo-diesel. A four-drive version, the 325iX touring, will also be available in future.

In addition to the styling features already described, another significant objective in developing the touring was to give the bodyshell a high standard of all-round stability. BMW's development engineers have gone to every effort in design and testing in order to reach this objective.

Apart from the new roof and modified rear side panels, the vehicle's longitudinal and transverse support members have been substantially reinforced for extra rigidity. New intersecting panels and load-bearing structures as well as the bonded side and rear windows also help to provide greater stiffness.

The rear hatch is supported when open by two gas pressure springs, the number plate panel on the hatch is contoured as a handle for convenient opening. The hatch extends down all the way to the bumper between the rear light clusters. This concept provides an optimum combination of good loading and unloading conditions, on the one hand, and simple stowing away of luggage, on the other.

Good streamlining is ensured by the wider side-sills fitted as standard as well as the spoiler integrated in the rear hatch. The touring has the same drag coefficient as its saloon counterpart, lift forces on the front and rear axles have been reduced significantly.

A rear window wash/wipe system with intermittent wipe is fitted as standard. Two washer nozzles are integrated in the wiper arm, the washer reservoir level is reliably monitored by the Check/Control.

To give the luggage/stowage compartment maximum versatility, the rear seats may be completely separated and folded down either individually or together. The seat bottoms thus folded to the front can be quickly removed by means of a simple unlocking mechanism, in this way providing even longer stowage space.

Four covered lashing points as well as a hard-wearing rolling cover behind the rear seats for covering the luggage compartment and its contents up to the rear hatch come as standard with the touring. A net for extra safety between the rear seats and the luggage compartment is available as an option.

Stowage spaces for various odds and ends and for accommodating the loudspeakers in a safe position are provided in the rear side panels. On the diesel and four-wheel drive models the battery is housed at the side in the luggage compartment.

In addition to the design features and fittings already mentioned, the following items also come as standard on the new BMW touring:

- Central locking on all doors including the rear hatch and fuel filler flap
- Electrically adjustable rear-view mirrors left and right in body colour
- Green heat-insulating glass all round
- An additional courtesy light for the luggage compartment
- 6 J x 14 light-alloy wheels with 195/65 R 14 H tyres on the 320i touring and 324td touring and 195/65 VR 14 tyres on the 325i touring; the 325iX touring comes with TD 200/60 VR 365 tyres on 365 x 150 TD light-alloy wheels
- Disc brakes at the rear, vented on the 325iX touring
- Bumpers either in body colour or an ideal matching colour
- Satin-chrome finish (blacked-out chrome)
- Permitted load increased to 480 kg (1058 lb)

The outstanding suspension of the BMW 3 Series with its renowned qualities has been re-aligned for the specific requirements of the touring models. This re-tuning of the springs and shock absorbers in conjunction with the brakes modified in accordance with the new weight conditions rounds off the harmonious overall concept of the BMW touring.

The touring is the first 3 Series available as an option with self-levelling rear suspension. This sophisticated suspension control system is combined with sports tuning of the suspension as well as power steering. No additional source of energy is required for the hydropneumatic adjustment of the rear axle level, since the self-levelling is connected to the power steering oil circulation system. The tandem pump in the power steering thus also provides the system pressure required for the self-levelling rear axle.

The BMW 5 Series

4-cylinder	BMW 518i
	BMW 520i with catalyst
	BMW 524d
	BMW 524td
	BMW 525e with catalyst
6-cylinder	BMW 525i
	BMW 528i
	BMW 535i with catalyst
	BMW M 535i with catalyst
	BMW M 5 (4-valve/cylinder engine)

The 5 Series appeals to the active driver who sees the present and future in progressive high-quality technology and craftsmanship in combination with a suitable car size and select equipment. It shows that high performance need not be a contradiction to economy.

BMW 518i

77 kW or 105 bhp together with the L-Jetronic turn the 4-cylinder "basic" model of the 5 Series into a vehicle with the typical spirited BMW character. It accelerates from 0 - 100 km/h in 12.6 sec, the standing-start kilometre takes 34 sec, acceleration from 80 - 120 km/h in direct gear is in 14.1 sec, and it has a top speed of 175 km/h (109 mph).

In spite of the high performance, the average consumption is 8.0 ltr/100 km (35.3 mpg) (518i with 5-speed gearbox). The BMW 518i will therefore not be looked down upon by its bigger six-cylinder brothers in the 5 Series.

BMW 520i catalyst

The next largest model, the BMW 520i catalyst, unites in its 6-cylinder injection engine with Motronic and 95 kW (129 bhp) economy and superior performance (0 to 100 km/h: 12.1 sec, top speed: 190 km/h or 118 mph). The wide range of standard equipment has been extended in the 520i to include power steering, a 5-speed gearbox, fuel consumption gauge and electronic heater control. This model also comes as standard with a more sophisticated rear axle with auxiliary trailing arms swept back by 13^{o}, disc brakes front and rear, wide 195/70 R 14 H tyres and rev counter.

The version with 4-speed automatic transmission provides an acceleration of 0 to 100 km/h in 14.4 sec and a top speed of 183 km/h (113 mph).

BMW 525i

The output of the large 6-cylinder engine with electronic fuel injection has remained at 110 kW (150 bhp) (0 to 100 km/h: 9.8 sec; top speed 201 km/h or 125 mph). The 525i meets high demands for equipment and comfort; suffice it to mention the active Check/Control in the upholstered panel between the sun visors, the driver's seat with height and rake adjustment, adjustment of the steering wheel for reach and the fuel consumption gauge (EC = Energy Control), which in conjunction with the standard 5-speed gearbox permits an especially economical style of driving. This model also features the 528i rear axle with auxiliary trailing arms and a sweepback angle of 13^{o}. Light-alloy wheels with 200/60 R 390 H TRX tyres are another standard feature of the BMW 525i.

BMW 528i

The BMW 528i offers even better performance. With the same wide range of interior equipment as the 525i, a chassis specially tuned to the car's output and a 5-speed gearbox, the BMW 528i appeals to drivers who expect the performance of a sports car but the comfort and roominess of a saloon (0 to 100 km/h: 8.4 sec, top speed 215 km/h or 133 mph).

In the BMW 528i comfort attained through effortless achievement of performance is complemented by lower fuel consumption.

The BMW 528i also offers a wider range of standard features: light-alloy wheels with 200/60 VR 390 TRX tyres and ABS anti-lock brake system.

BMW 524td, BMW 524d

BMW's decision to enter the diesel segment was determined not only by the conditions in today's and tomorrow's car market, but also by the fact that BMW, as a classical engine manufacturer, set itself the task of developing a diesel engine uniting the virtues of the diesel principle with the most striking BMW qualities: smooth running and high performance. And particularly with the BMW diesel it is essential that driving pleasure and sportiness do not run counter to the qualities demanded by the customer's practical considerations and changing market conditions.

The tried and tested 6-cylinder M20 engine, which is used as a power unit in the 3 and 5 Series with a displacement of 2.0 to 2.7 litres, was chosen as the point of departure for the BMW turbo-diesel engine. Turbocharging and large-bore inlet and exhaust valves ensure the high performance typical of BMW (85 kW/115 bhp). The refined swirl chamber facilitates increased mileage and low engine noise levels.

Thus the 524td achieves remarkable performance. It takes just 12.9 seconds to accelerate from 0 to 100 km/h, and covers the standing-start kilometre in 34.3 seconds. In fourth gear it accelerates from 80 to 120 km/h in 13.7 seconds and reaches a top speed of 180 km/h (112 mph). And yet the 524td consumes only 7.1 ltr/100 km (39.8 mpg) (DIN) in the combined cycle.

Thanks to the 6-cylinder turbocharging principle and the use of a two-mass flywheel for optimum running smoothness as well as the overall vehicle concept specially tailored to diesel operation, it was possible to create a diesel which in terms of its performance characteristics is one of the most economic diesels of its class.

Launching the BMW 524d (without turbocharger), BMW is now giving the successful 524 td (turbo-diesel) a smaller - less powerful - brother within the same model series. This new car has the same engine as the BMW 324d received so positively by the market. The 6-cylinder 2.4-ltr diesel engine develops 63 kW/86 bhp and averages a fuel consumption of 7.6 ltr/100 km (37.2 mpg) with the 5-speed gearbox fitted as standard (5.7 ltr/49.6 mpg at 90 km/h, 7.9 ltr/35.8 mpg at 120 km/h, 9.2 ltr/30.7 mpg in city traffic). The top speed of the BMW 524d is 164 km/h (102 mph).

With its elaborate encapsulation of the engine plus numerous other features, the 524d runs extremely quietly at all speeds. Motoring refinement is further increased by the two-mass flywheel also featured on the turbo-diesel and eta engines.

Weighing 25 kg (1330 kg/2933 lb) less than the 524 td, featuring a shorter final drive (3.91:1 instead of 3.15:1, as on the 524 td) and fitted with power steering as standard, the 524d is specially designed for good performance and engine flexibility. Disc brakes front and rear provide optimum safety on the road.

BMW 525e catalyst

A BMW eta car is distinguished by markedly reduced fuel consumption without loss of performance superiority and driving comfort.

The 2693-cc power plant offers specific performance characteristics with high torque at low revs (230 Nm or 170 ft/lb at 3200 rpm) in the interest of the best economy possible.

The demands made of the eta engine (95 kW/129 bhp) could thus be formulated as follows: It should consume substantially less fuel, especially at normal driving speeds, without loss of performance superiority.

Thus, measures are required to provide an increase in torque at low revs. For this purpose the BMW inline 6-cylinder lent itself especially well, since the operation of an engine at low revs demands extremely smooth running, a virtue of the M 20 (company designation) that experts have always recognized.

So much for the changes in engine characteristics: higher torque at lower engine speeds. This feature, however, can be put to full advantage only in connection with a suitably high rear-axle ratio chosen for good acceleration and response. It is by means of this gear ratio that the engine-operating range is shifted to lower revs. The same speeds and, thanks to the high torque, sometimes even better performance are achieved at markedly lower engine speeds.

In addition, the overall eta concept includes adaptation of the individual vehicle components, the use of Digital Motor Electronics with fuel cut-off when coasting and lower idling speed, reduced weight and a 5-speed manual gearbox or 4-speed automatic transmission. These are all measures combined to make full use of the optimisation of engine efficiency and to preserve what is indispensable to BMW, namely driving pleasure.

The considerable reduction in engine speed is also reflected by a substantially lower noise level. At the same time, the much quieter interior means greater comfort for driver and passengers alike.

BMW 535i catalyst
BMW M 535i catalyst

The top model in the 5 Series of BMW AG is equipped with the 3.5 litre 6-cylinder engine. Boasting the latest development on the Motronic front, it churns out 136 kW (185 bhp). The maximum torque of 290 Nm (214 ft/lb) is achieved at 4000 rpm. A reinforced, fully synchronized, overdrive-type five-speed gearbox takes care of the transmission of power. Four-speed automatic transmission with electro-hydraulic control is available as an option. The final drive has also been reinforced and is equipped as standard with a 25 % limited-slip differential. To tune the suspension to "M" standards gas pressure absorbers are employed.

The aerodynamics were subjected to keen examination in the wind tunnel. The extensive use of M Technic spoilers resulting from this refinement with integrated bumpers, broadened side-sills, and a special two-tone rear spoiler, is responsible for keeping the bodywork's drag coefficient down to 0.37 despite greater cooling demands and wider tyres. The vehicle weighs 1390 kg (3065 lb) empty.

These measures all have their effect, of course, on the impressive performance. The car accelerates from 0 - 100 kmh in just 7.9 sec, covers the standing kilometre in 29 sec and, more or less as a spin-off of all this, has a top speed of 212 km/h (131 mph). Of greater importance is its pulling-away power, which makes overtaking much less of a touch-and-go affair: in direct drive it can accelerate in a mere 9.9 secs from 80 to 120 km/h. The power-to-weight ratio tells its own story: 10.1 kg/kW.

Special sports seats at the front guarantee both comfort and firm support in all directions; the M Technic sports steering wheel offers a firm grip. ABS anti-lock brakes are standard equipment, while air conditioning is available as an optional extra.
The tyres: 220/55 VR 390 TRX on sporting 165 TR 390 M Technic light-alloy rims.

Particularly welcome news with such a high-performance vehicle is the low fuel consumption: on average, the car can make do with 11.4 litres of premium for 100 km (24.8 mpg). With its 70 litre (15.4 Imp gal) tank ranges of as much as 600 km are feasible, depending on how the car is driven.

BMW M 5 - the four-valve model in the 5 Series

Based on the proven BMW 5 Series, the engineers of BMW Motorsport GmbH have developed a truly unique car, the BMW M 5. Almost identical to the basic model from the outside, the M 5 offers absolutely outstanding performance and superior driving characteristics.

Power is provided by the further improved straight-six engine with light-alloy cylinder head already featured in the BMW M1. With a capacity of 3.45 ltr and two overhead camshafts, this is the same engine that powers the BMW M 635 CSi coupé. Four valves per cylinder, centrally arranged spark plugs and Digital Motor Electronics (Motronic) provide an output of 210 kW (286 bhp) at 6500 rpm. This equals an output per litre of 60.8 kW or 82.7 bhp. The maximum torque of 340 Nm (250 ft/lb) is developed at 4500 rpm.

A harder sports-tuned suspension with single-tube gas pressure shock absorbers provides a high standard of motoring safety in line with the car's performance. Optimum roadholding is provided by 165 TR 390 forged light-alloy wheels with 220/55 VR 390 tyres.

The brakes with reinforced and extra-large fixed-calliper discs at the front and fist-calliper discs at the rear are supplemented by a specially designed anti-lock braking system (ABS).
Engine power and torque is conveyed to the drive wheels by a reinforced Getrag 280/5 five-speed gearbox and a limited-slip differential with 25 per cent locking action. To further improve the axle load distribution, the 90 Ah battery is housed in the luggage compartment.

The BMW M 5 accelerates to 100 km/h (62 mph) in 6.5 seconds, the standing-start kilometre comes after 26.8 seconds. When accelerating from 80 to 120 km/h (50 to 75 mph) in direct gear, for example when overtaking, the M 5 requires only 7.7 seconds. Despite this absolutely outstanding performance, the M 5 consumes only 11.3 ltr/100 km (25.0 mpg) measured according to the DIN combined cycle.

Both rear-view mirrors are painted in the same colour as the car and are heated electrically, like the lock on the driver's door and screenwasher nozzles. Electrical central locking is standard. The floor inside the passenger compartment, doors and parcel shelf are fully carpeted in velour quality, while the door centrepieces are padded with exclusive Highland fabric. BMW sports seats at the front - also in Highland upholstery - and the M sports steering wheel emphasize the outstanding character of this car. The luggage compartment is velour-carpeted. In principle the M 5 is available with all optional extras for BMW cars, inasfar as such extras and special equipment are technically feasible for this sports model.

In its interior design and features, the BMW M 5 satisfies the most discerning purchasers and offers a wide range of individual fittings to suit the specific taste of each driver. The M 5 is available on individual order as a special model from Motorsport GmbH. It is intended for motorists seeking to combine all the positive features of a classic sports car with the assets of a four-door saloon.

The airbag is available in all 5 Series models as an optional extra.

The BMW 6 Series

BMW 635 CSi **with catalyst**
BMW M 635 CSi **with catalyst**

The characteristic thing about BMW coupés is that they invariably become classics the moment they enter the market. This classic value results from their synthesis of a Grand Turismo, on the one hand, and advanced BMW technology, on the other. To further improve the classic 6 Series along these lines, BMW's engineers have introduced a wide range of new features and distinctive qualities for the coupé.

Concentration on the essential, namely continuous improvement in function, was the goal in the further development of the 6 Series coupés. The series represents a technology that permits great distances to be covered with minimum demand on the driver, passengers or the car itself. Easy-to-control braking, precise, responsive steering, effortless overtaking and superb roadholding keep energy costs down. Passengers are spoilt by the high standard of comfort and wide range of standard features including, for example, ABS, 5-speed gearbox, Service Interval Indicator, on-board computer and heating with electronic temperature control.

The BMW 6 Series consists of the 635 CSi (available exclusively with catalytic converter in Germany) and M 635 CSi. The 635 CSi has been upvalued to the technical standard of the 735i and features the same 3.5-litre engine as its saloon counterpart. The M 635 CSi, as before, comes with BMW's outstanding 24-valve power unit. Together with the 7 Series saloons, the coupés therefore come at the very top of the BMW model range.

In addition to many other advantages in terms of fuel economy and clean exhaust emissions, the engine technology adopted from the BMW 735i offers a considerable increase in output and performance on the road, particularly with the catalyst model: Now sheer driving pleasure in the

BMW coupé is ensured by 155 kW/211 bhp instead of the former 136 kW/185 bhp. The output of the model without catalytic converter is also up by two kW to 162 kW/220 bhp. In conjunction with the shorter and thus even sportier final drive ratio, this shortens acceleration to 100 km/h by 0.2 to 8.1 sec and, in particular, improves engine flexibility when accelerating from 80 - 120 km/h in direct gear, meaning that the coupé now requires only 8.9 sec (0.4 sec less) for this exercise. The top speed of the 635 CSi catalyst with 5-speed manual gearbox has also been increased by 8 to 225 km/h. The performance figures of the M 635 CSi remain largely unchanged: The 191 kW/260 bhp of the catalyst model enable this coupé to accelerate to 100 km/h in 6.9 sec - performance reminiscent of a thoroughbred sports car in every respect.

From the outside the 6 Series differ from their predecessors through their new bumpers and the front air dam with its integral spoiler. The new bumper system with built-in impact absorbers fulfilling both the ECE and US standards absorbs collisions up to 4 km/h without damage - and at higher impact speeds this unique safety concept helps to reduce the cost of repair.

Taking a close look at the new 6 Series models one will notice the different headlights: Now, the BMW coupés also feature the ellipsoid-technology low-beam headlights and foglamps first presented on the BMW 7 Series.

The other new features of the coupé are largely invisible - highly significant but not where they can be seen. Apart from the modifications of the engine, various improvements have been introduced on the suspension: The 635 CSi now features twin-sleeve gas pressure shock absorbers providing new, dynamic but comfortable driving features; the 635 CSi catalyst comes with self-levelling on the rear axle. Further refinements are to be found in the interior, such as the interior colours and velour upholstery of the 7 Series as well as special options such as the BMW Highline finish.

All this helps to give the BMW coupé not only timeless elegance but also the latest state of the art in automotive technology.

The BMW 7 Series

Vehicle concept
BMW 730 i
BMW 735 i/735 iL
BMW 750 i/750 iL

The overall styling of the new 7 Series is characterized by typical BMW features on the one hand and new styling highlights on the other, both blended harmoniously in a body of new dimensions.

The overall impression conveyed by the car is also shaped, however, by innovative technologies, supreme quality and reliability ensuring all the basic functions required for carefree motoring. As a result, therefore these new cars excel through their outstanding performance and driving characteristics, an above-average standard of smoothness and motoring refinement, unique heating, ventilation and air conditioning and, not least, an unprecedented top-of-the-range engine.

Noise emission control

BMW's objective in this context was not only to fulfill the toughest exterior noise limits, but also to provide maximum comfort inside the car through a minimum noise level. In other words, the driver and his passengers are not to be disturbed by any individual noises, wind and rolling noise being limited to an absolute minimum also at high speeds.

Exterior noise

Extra-large mufflers are therefore used to minimize the noise of both the intake and the exhaust. Consisting of mutiple plates and featuring extra-rigid intermediate panels, the silencers emit only very little noise from the surface. Noise emissions are further reduced by the reflection silencer design which prevents noise from being transmitted to the outside. The

engine compartment lid is covered by sound-deadening materials inside. The tyres were also selected, inter alia, to minimize the noise level. In conjunction with these improvements, numerous additional features on the engine and transmission help to ensure further noise control outside the car.

Interior noise

Interior noise, as perceived by the driver and passengers, depends largely on drive and components noise, on the one hand, and wind and rolling noise, on the other. A large number of measures have therefore been taken to achieve an extremely low interior noise level in comparison with other cars.

As an example, the engine mounts, front axle supports, engine supports and transmission mounts all feature extra-rigid reinforcement plates to minimize the noise level, as does the bodyshell around the gear-shift lever and centre mounts. The engine supports feature hydraulic dampers, the propeller shaft is fitted with a special joint for extra running smoothness. The final drive is suspended in dual elastic mounts, meaning that rubber bushes are used both between the final drive itself and the final drive support, and between the support and the body of the car.

Benefitting from interacting components and extra-large connection plates as well as the bonded windscreen and rear window, the bodyshell offers a high standard of static and dynamic bending and torsional rigidity.

All sources of noise transmission and emission are covered by the built-in floor insulation, the self-supporting pre-shaped roof lining, noise-absorbing materials, specially designed pre-shaped seals and highly effective sound-proofing on the A-pillars and luggage compartment bulkhead.

The fuel pump is suspended within the fuel tank.

Wind and rolling noise is minimized by the optimum streamlining of the car. Important contributions to this effect are made by the windows fitted at the outside and featuring newly developed three-piece seals, the minimum tolerances between components, elastically sprung tie-bars and separate spring/shock absorber pivot points on the front axle. The spring strut support on the precision-arm rear axle has been enlarged for extra refinement and noise control. Additional sources of noise transmission are dampened and eliminated by soundproofing plates in the sills and C-pillars. Absorption materials in the air extraction ducts and the use of the entire luggage compartment as a kind of silencer helps to minimize the transmission of noise through the air-extraction pathways. Special inserts in the wheel arches reduce the noise otherwise caused by dirt swirled around by the wheels. The entire roof features reinforcement members and additional soundproofing.

Streamlining

The next objective was to bring the car's streamlining in line with the requirements of driving safety and motoring comfort. While keeping the drag coefficient at a minimum, the body also had to be designed for maximum down-forces, optimum stability in cross-winds and minimum contamination of the windows.

The streamlining of the body is enhanced by the low-slung front section with the engine compartment lid rising up towards the windscreen, the greater rake of both the windscreen and the rear window, the spoiler integrated in the rear section, the front bumper with integrated spoiler and the bumper/spoiler unit at the rear. Side windows flush with the body, tapered corners at both the front and rear end of the car, rounded A-pillars and wrap-around C-pillars also contribute to the car's good streamlining.

The underfloor has also been designed for good streamlining: The floor pan is extra-smooth and some of the load-bearing components are fitted inside instead of outside. The silencers and catalytic converter are integrated in the underfloor wherever possible, the fuel tank has a smooth bottom and the engine compartment is covered by an underfloor panel all the way up to the front axle support.

Thanks to the optimized flow of air with minimum air flow losses the new 7 Series requires only a relatively small and light radiator. The efficiency of the radiator fan has been improved and intake openings for fresh-air cooling of the engine and components are integrated in the cooling air shaft.

The good streamlining of the car is further enhanced by the windscreen and rear window bonded almost flush with the body and featuring water ducts, by the flush wheel covers or light-alloy rims, aerodynamically styled side-sills, air shafts for cooling the brakes integrated in the body itself and special sealing covers at the front to minimize contamination of the engine compartment.

The standard ECE-version of the 730 i has a drag coefficient (cd) of 0.32. With a cross-section of 2.1 m^2, this provides an overall front area of cd x A = 0.67. Aerodynamically relevant features on the 735 i versus the 730 i are the wider 225/60 V15 tyres on 7" light-alloy wheels, which, with the same drag coefficient, increase the cross-sectional area of the car to 2.11 m^2 and result in a cd x A factor of 0.68. Compared with the 735 i, the 750 i has air conditioning and an additional air flow intake at the front.

In designing the entire car and, in particular, in conceiving the rear air dam and luggage compartment lid contour with integrated spoiler, BMW's engineers sought above all to maximize the down-forces acting on the car and its axles.

Despite its low drag coefficient, the new 7 Series is extremely stable in cross-winds and has minimum yaw and pitch.

Water is efficiently kept off the side windows by slender gutter rails fastened on to the windscreen frame. Through their design these gutter rails prevent the formation of air swirls and do not increase the car's air drag.

Contamination of the rear window is kept at a minimum by an all-round gutter joint in the window frame.

Automatic Stability Control (ASC)
with integrated
Engine Drag Control (EDC)

The new 7 Series incorporates another special feature to help the driver and increase the standard of driving safety. Just like the anti-lock braking system (ABS) controls brake power individually on each wheel as a function of the grip of each tyre on the road, Automatic Stability Control adjusts the traction of the drive wheels in accordance with the frictional coefficient of the road surface.

Acting within fractions of a second, ASC keeps the car stable and the driver in control despite possible driving errors or false assessment by the driver of road conditions.

Objectives

Automatic Stability Control (ASC)

- Driving stability

  ASC keeps the car stable on straights and particularly in bends no matter what the frictional coefficient of the road surface may be, regardless of engine power.

- Anti-spin

  Traction and anti-spin geared to the frictional coefficient guarantees optimum transfer of engine power to the road making maximum use of the coefficient available. The system automatically adjusts to the limited-slip differential (final drive with 25 % locking action) possibly fitted as an option.

- Convenient operation

  ASC enhances motoring comfort by providing an exact control of engine power when accelerating and on the road (eg in fast bends).

Engine Drag Control (EDC)

- Driving stability

  EDC provides a "soft", ie, deferred correction of abrupt changes in engine load (taking back the throttle) and down-shifting particularly at high engine speeds. Anti-spin control of the drive wheels braking during this process improves driving stability particularly on slippery roads with a low frictional coefficient.

- Convenient operation

  EDC takes over the requisite control functions when changing engine load and down-shifting both with a manual gearbox and automatic transmission with manual control, in this way relieving the driver of yet another task at the wheel.

Description of functions

Automatic Stability Control (ASC)

The various functions of ASC are provided by the interaction of
ABS - anti-lock braking system
EOC - Electronic Output Control and
MOTRONIC - engine management
(see Enclosure).

Engine Drag Control

As soon as the ABS wheel pulse sensors detect a difference in wheel revolutions on the front and rear axles (= spin), engine torque is controlled through three functions once a critical spin limit is exceeded: throttle butterfly control, ignition timing and ignition cancellation with fuel supply switch-off.

Throttle butterfly control is made possible by combining ASC with Electronic Output Control (EOC): The gas pedal operates a position sensor connected to the throttle butterfly actuator via the EDC control unit. As soon as wheel spin exceeds a certain limit, the control unit intervenes as a function of road speed and acceleration.

With the position of the gas pedal remaining unchanged, the control unit reduces the throttle butterfly opening angle (which is then enlarged again as soon as wheel spin drops below the critical limit). This ensures that the driver can make optimum use of the power of the engine, depending on road conditions.

This throttle butterfly control is supplemented by ignition control whenever there is a particularly dynamic (= sudden) change in the frictional coefficient - for example on black ice or in puddles. Engine torque is reduced by retarding the ignition or completely cut off by cancelling the ignition and switching off the fuel supply. This latter measure ensures that the fuel injected into the combustion chambers is consumed in full.

Functions of Engine Drag Control (EDC)

Like with ASC, the wheel pulse sensors determine when pre-programmed spin limits are exceeded and activate the Engine Drag Control as long as the gas pedal is not pressed down (= when the car is coasting).
Then three measures cut in:

- overrun control (interrruption of fuel supply) is cancelled
- the throttle butterfly is opened degressively as a function of engine speed
- the ignition is retarded, meaning that engine torque is developed particularly "softly".

Safety measures

To determine any deficiencies in the system two independent microprocessors constantly supervise and compare the main functions of ASC. As soon as a defect is determined in this way, the system switches off automatically and slowly returns the reduced throttle butterfly angle to the position on the pedal sensor, enabling the driver to drive the car like a conventional BMW.

Display and operation

ASC is activated as soon as the ignition is switched on. An additional button in the centre console enables the driver to switch the system off if desired (for example when driving in a very sporty style or when using snow chains on a loose surface).

The current operating mode is shown by the light in the button.

Operation of ASC is displayed to the driver by an indicator in the Check/Control, telling him that he is driving to the extreme limit of the car's stability.

A defect is shown both by the Check/Control and by an additional sound signal, the ASC button light going off at the same time.

Electronic Damper Control (EDC)

Together with the launch of the 750i/iL, BMW is introducing Electronic Damper Control as an option for the entire 7 Series.

The purpose of this two-stage, switchable damper adjustment is to give the driver the choice of a more comfort-oriented and softer or a sportier and more dynamic suspension.

This shock absorber system developed in cooperation with Fichtel & Sachs is combined with hydropneumatic self-levelling of the rear axle incorporating load-related shock absorbers. This ensures a smooth suspension at all times regardless of the load the car is carrying and the damper setting chosen by the driver.

Components

Electronic Damper Control comprises the following components:

- Adjustable shock absorbers on the front and rear axle
- Self-levelling with load-dependent shock absorbers on the rear axle
- Selector switch (comfort/sports)
- Control unit

Shock absorbers

The shock absorbers switchable to two different settings incorporate two valve systems operating independently in double pistons and enable the driver to choose either a comfort-oriented or sporty and taut suspension, depending on his personal reuqirements. The settings are switched by an electric motor fitted in the hollow piston rod of each shock absorber and feeding oil by means of rotating valves to the appropriate valve piston. Each of these valves provides optimum damper response on the compression and expansion stroke, in this way giving the car a sportier or more comfortable suspension, as desired. The damper curves are thus spaced out at a ratio of 1:3, meaning that the damper forces of the sports setting are about three times those of the comfort setting.

Self-levelling with load-dependent rear axle shock absorption

The combination of adjustable dampers and self-levelling with load-dependent shock absorption ensures that spring compression and expansion will always remain the same regardless of the damper setting chosen by the driver and the load the car is carrying.

The essential new feature of this self-levelling is the additional damper module in the oil flow between the shock absorber and pressure reservoir, which automatically actuates another damper valve in accordance with the load the car is carrying. This gives the car a consistent suspension regardless of the load it is carrying, so that it will always offer the same driving characteristics irrespective of load.

As soon as the admissible rear axle load is exceeded a wheel camber sensor on the rear-wheel suspension transmits a "Self-levelling" signal to the Check/Control, warning the driver that the tyres may be subjected to adverse conditions.

Selector switch

The selector switch with the comfort and sports positions is located on the centre console. The current damper setting is displayed by a function telltale in the switch, illumination of the entire unit ensuring easier operation at night.

Control unit

The EDC control unit actuates the electric motors in the shock absorbers in accordance with the setting chosen on the selector switch. The two voltage signals generated for this purpose are either "change" or "maintain".

The control unit also monitors the entire system for proper function and feasibility of the signals, meaning that any deficiencies in the wiring between the switch and the control unit, the control unit and shock absorbers, and in the switch itself will be immediately determined.

As soon as this is the case the function telltale in the switch will go off, showing the driver that the system is no longer working.

Graphs

- Cross-sectional drawings of shock absorbers
- Shock absorption curves
- Influence of load-dependent shock absorption on suspension behaviour

Power Units

6-cylinder engines

The 3.0 and 3.5-ltr engines have been further improved and refined with the following objectives in mind:

- To achieve high output and torque, particularly with the standard catalyst models.
- To minimize fuel consumption through maximum efficiency.
- To reduce engine noise for supreme motoring comfort and low noise emissions outside the car.
- To remain significantly below even the strictest emission standards and to maintain this efficient emission control throughout a long running life also under European driving conditions.
- To achieve supreme quality, reliability and ease of service.

Resistance to the fuel/air flow must be kept at a minimum to ensure an optimum charge of the cylinders under full load. On the intake side this has been achieved by using air filters with a large surface, an intake manifold with an extra-large diameter and intake valves with a large cross-section. The special machining finish of the intake ducts to provide a high-quality surface and the efficient flow of the fuel/air mixture in the vicinity of the valves also contribute to this high standard of all-round running efficiency.

On the exhaust side the same objective has been reached by using a specially designed extra-large exhaust manifold for an optimum flow of exhaust gases and a large catalyst with an appropriate cross-section.

To run with a high standard of efficiency an engine also requires optimum combustion conditions. Accordingly, the following improvements of the 6-cylinder power units make an important contribution in this respect:

- Optimum combustion chamber with two piston crown surfaces for highly efficient power development.

- Piston crown designed to divert fuel/air flow towards the spark and generate turbulence (air swirl) in this area.

- Special machining of the combustion chamber and valve seat rings to minimize compression ratio tolerance.

Fuel consumption

In addition to performance and environmental care, large cars in particular must provide a good standard of fuel economy. The engines of the new 7 Series therefore have a high compression ratio (9.0 : 1 for unleaded regular-grade fuel) to keep fuel consumption at a minimum. The modifications of the combustion chamber already mentioned serve to optimize the combustion process as such. The spark plugs with a protruding electrode keep fuel consumption at a minimum with the engine running at or close to idling speed. The supply of fuel is metered with a high degree of accuracy provided by the exact, single injection per work cycle. When starting the engine cold, the supply of fuel is accurately controlled by the automatic choke. Flow resistance throughout the intake and exhaust systems has been kept at a minimum to provide a smooth and efficient cylinder charge. Cold air is drawn in from outside the engine compartment for maximum running efficiency (= good cylinder charge and minimum knock effect).

Since it is better to avoid noise from the outset rather than reduce the noise level later by taking elaborate measures, the engines have been designed from the very beginning for a low noise level and minimum noise transmission. As an example, the oil pump is specially reinforced by fins in order to minimize noise pressure. It also features a reinforcement shell to increase the rigidity of the engine/transmission unit, reducing vibrations - and, accordingly, the noise level - around the connection flange.

The large intake air silencer is fitted with a matching diffusor. The entire intake system is held by rigid mounts in order to minimize vibrations. Oil pump and chain noise is reduced by a chain tightener, the chain itself being fitted with predetermined tolerance.

Decisive progress has been made in the context of emission control through the development of a new generation of high-efficiency catalytic converters. Exhaust emission temperatures are kept at a minimum, the fuel/air mixture as well as the ignition angle have been optimized, the catalytic converters feature temperature-resistant surface coatings and the lambda probe is housed in a new protection tube for maximum service life. The catalytic converter itself has been specially designed to fit into the floor pan and therefore offers a particularly large volume for maximum efficiency.

Engine control/electrical and electronic systems

The electronic control units feature emergency programmes and defect detection routines in order to achieve an optimum standard of reliability and efficiency.

The high-output alternators start charging from low engine speeds and are cooled by a special fresh-air intake.

Engine functions are controlled by a new Motronic generation with a very wide range of individual features. One of these new features is the adjustment of pre-control to engine and wear-specific parameters.
Some other functions and features of Motronic:

- Electronic, grid-controlled ignition
- Electronic, grid-controlled fuel injection
- Air/fuel ratio kept at $\lambda=1$ for maximum catalyst efficiency
- Exact maintenance of ideal speed provided by self-contained idling control

- Cylinder charge when idling exactly adjusted to engine-specific and wear-related operating parameters

- Exactly controlled supply of fuel vapour from the tank to the intake system via activated carbon filters (on catalyst models)

- Software coding to reduce the number of engine control units required for the individual countries (national specifications)

- Control units with self-test function and defect memory during operation, diagnosis by service organisation

- Minimum exhaust emissions provided by optimum selection of the injection time for each group of cylinders

Quality, reliability and ease of service

The new 7 Series features numerous innovations to ensure a very high standard of quality, reliability and service ease right from the outset.

The electronic control units are housed in the electronic box and thus efficiently protected from high and low temperatures, dirt and water. All connectors have round ring seals and are specially designed and marked to avoid confusion. New technologies in assembling the electronic components provide a high standard of all-round reliability and the printed circuits of the electronic control units are made of top-quality materials.

The entire engine compartment is clear and uncluttered with all components and modules properly arranged for their individual functions. Cables and wires are installed in special cable shafts. Featuring a self-diagnosis function and emergency programmes, the Motronic helps to detect any deficiencies and offers a high standard of all-round dependability. The oil filter is accessible from above for greater ease of service. The oil filter cartridge has been specially designed to protect the environment and is hardly contaminated by any residual oil when replacing the filter. The exhaust manifold, outlet valves and coolant hoses are all made of top-quality materials. Designed for large capacities and operating with a high

standard of reliability, the oil pump guarantees an efficient supply of oil even under maximum load. Oil consumption itself is kept at a minimum through the use of high-quality piston rings. The tank bleeding system has been redesigned for even greater efficiency, avoiding any malfunctions together with the grid-controlled Motronic even in extreme climatic conditions.

The Motronic features a separate idle speed control function for automatically adjusting and compensating all factors such as engine temperature, run-in conditions, tolerances, wear, etc.

Fuel supply system

The fuel tank is housed out of harm's way, suspended in brackets within extra-rigid supports beneath the luggage compartment where it is additionally protected by the spare wheel trough. The 730 i and 735 i have a fuel tank capacity of 90 ltr (19.8 Imp gals), the 750 i a capacity of 102 ltr (22.4 Imp gals). In conjunction with self-levelling, the larger tank is also available as an option on the 730 i and 735 i. The fuel pump is integrated in the tank itself and comprises a pre-delivery pump. This reduces the suction height to be overcome and helps to further reduce the noise level. The fuel tank filler pipe is on the right-hand side of the car.

Power Transmission

The power transmission has been designed to reach the following primary objectives:

- To minimize the noise level, optimize the gear-shift, reduce weight but withstand high thermal and mechanical loads with compact dimensions.
- To optimize the connection of the gear-shift lever to the the transmission and the bodyshell.

- To provide electro-hydraulic control with an optimum gear-shift and individual driving programmes.
- To avoid any transmission of noise between the propeller shaft, final drive and bodyshell.

Clutch

The new 7 Series features a single-plate diaphragm-spring clutch.

Manual gearbox

The 5-speed manual gearbox excels through its compact dimensions and low weight. The gears are extra wide and precision-machined following heat treatment in order to keep running noise at a minimum when the gears are in mesh. The synchronising units do not cause any kind of scratching noise, not even when cold. Cooling fins at the bottom of the gearbox serve to reduce the temperature level. The flywheel has high mass inertia momentum and a propeller shaft damper to avoid gearbox noise. The noise level is also kept at a minimum by the pressure-cast aluminium shift arm, the single-point mount on the gearbox and optimized rubber bushes. The aluminium gearbox cross support is extra rigid to reduce the transmission of noise from the gearbox to the bodyshell.

Automatic transmission

In the 735 i (optional) and 750 i (standard) the 4-speed automatic transmission features electro-hydraulic control. This transmission is also available as an option on the 730 i.

Gear-shift accuracy is enhanced by the close tolerances of the gear-shift mechanism. All clutch plates are finished with asbestos-free linings to protect the environment. To match the supreme torque and power of the 12-cylinder engine, the automatic transmission has been reinforced on the 750 i featuring an extra-large torque converter, a larger converter lock-up clutch, additional clutch plates and extra-strong shafts and freewheels.

The electro-hydraulic control system features "intelligent" control functions automatically adjusting the gear-shift point to varying road conditions. This ensures low fuel consumption, outstanding performance and superior motoring comfort. Pressure in the hydraulic system is controlled to automatically compensate any tolerances, effects of increasing vehicle age and other external factors, thus providing a smooth shift of gears under all conditions. The electronic system monitors its own functions, any deficiencies being stored in the memory and quickly detected by the workshop through the diagnostic plug. Comprising a smaller number of components than before and featuring integrated functions, the control unit is absolutely reliable and foolproof. The switch for selecting transmission programmes is illuminated to provide optimum clarity.

Final drive

The propeller shaft features a centre bearing running in dual elastic mounts in order to minimize the transmission of noise from the power train to the body (double insulation on vulcanized rubber rings). An additional compensation joint is fitted in front of the final drive to provide absolute running smoothness. The drive half-shafts have an appropriate standard of torsional rigidity to match the inherent vibration frequency of the power train.

Chassis and Suspension

The primary objective with the chassis and suspension was to optimize the basic chassis parameters such as wheelbase, track, axle load distribution and body rigidity.

A further objective was to achieve a perfect match of the front and rear axles in order to optimize the car's roadholding and driving characteristics. The aim, therefore, was to combine sporty and safe behaviour with a high standard of motoring comfort. The transmission of noise from the axles to the body was naturally to be kept at an absolute minimum, further

objectives being superior traction and smoothness when accelerating, minimum steering forces when parking and driving in general and, not least, good braking characteristics with ample safety reserves when driving at high speeds and in extreme conditions.

Front Axle

The proven double-joint spring strut front axle, which offers an additional dimension over conventional axle designs, has been further refined for even better directional stability, minimum steering forces and anti-dive when braking. The tie-bars are connected to the track control arm by extra-large, soft rubber bushes. Serving to positively connect the two tie-bars, the track control arm is mounted on the body through double elastic supports in order to minimize the transmission of noise.
The extra-rigid front axle support is specially connected with the engine support in order to prevent any inherent vibrations that may be felt by the driver and passengers.

The wheel bearings feature maintenance and adjustment-free helical ball-bearing units.

The extra-large track of the new 7 Series provides optimum support on all sides, efficiently compensating side-forces and preventing swaying movements of the body.

Separate supports for the spring struts and shock absorbers guarantee a very high standard of suspension and running smoothness, particularly on short, staggered bumps and rough road surfaces.

Rear Axle

The multi-link kinematic precision-arm axle with anti-dive and anti-squat guarantees accurate wheel suspension and geometry through the main and auxiliary semi-trailing arms. This provides optimum behaviour in bends, a

smooth response to the accelerator and changes in engine load, very good directional stability, a very good feel for the road and minimum sensitivity to cross-winds.

The dual elastic final drive mounts minimize the transmission of vibrations and ensure that virtually no rolling and drive noise is conveyed to the passenger compartment. The rubber mounts of the final drive and the rear axle supports are carefully matched to provide optimum comfort and motoring refinement.

Large rubber mounts and spring strut supports on the rear axle also ensure optimum running smoothness and a very comfortable ride.

The rubber suspension of the final drive is designed to provide a slight understeer as a function of transverse forces.

Suspension and shock absorbers

- Front axle

  The spring struts are fitted with inclined coil springs arranged eccentrically to the shock absorber axis. The twin-sleeve gas-pressure shock absorbers featured on the new 7 Series provide excellent motoring comfort with an optimum feel for the road. Separate support of spring and shock absorber forces guarantees a very good shock absorber response, exemplary driving comfort and minimum wheel roll noise.

- Rear axle

  The spring struts at the rear run parallel to the shock absorber axis. Twin-sleeve gas-pressure shock absorbers plus extra-large spring strut supports are also used on the rear axle, the shock absorber fluid retaining its viscosity throughout a large temperature range.

Heavy-duty shock absorbers are available for countries with high temperatures and poor roads. These are conventional and not gas-pressure shock absorbers, special dust covers and viton seals serving to keep the shock absorbers clean and resistant to high temperatures.

When towing a trailer the rear-axle suspension is adjusted accordingly, thus enabling the car to carry almost the same load as under normal conditions.

- Engine mounts
  Hydraulic engine mounts serve to minimize engine vibrations and noise and provide a constant damping effect regardless of temperature.

Steering

The power-assisted recirculating ball steering has a transmission ratio of 14.5 : 1. Power assistance and the valve curve have been optimized for minimum steering forces when parking but an ideal "feel" for the road when driving. The servo pump is made of aluminium and is therefore particularly light.

The steering drop arm is adjustable for height to provide an optimum toe-in adjustment. The safety steering column features a two-piece steering spindle and a deformation unit to prevent the steering column from being pushed back in the event of a collision.

Featuring no less than 26 notches on the steering wheel, the steering wheel lock will be reliably engaged as soon as the driver pulls the key out of the ignition.

The four-web key used on the 7 Series not only provides maximum security (since it is very difficult to copy) but also extra comfort (easy insertion) and minimum wear.

The 730 i has a four-spoke steering wheel with padded rim; on the 735 i and 750 i the steering wheel rim is leather-coated. The horn buttons are integrated in the steering wheel spokes.

Servotronic power steering geared to road speed is available as an option: The hydraulic system is combined with an electronic control unit to accurately adjust steering forces as a function of the speed at which the car is moving. The steering forces when parking at speeds of up to 10 km/h (6 mph) are therefore kept at an absolute minimum, while higher steering forces are deliberately required at higher speeds giving the driver a very good feeling for the road (accurate steering).

An airbag is available as an optional extra.

Brakes

The diagonal twin-curcuit brake system is designed for optimum brake power. The front axle features fist-calliper disc brakes in order to keep brake fluid temperatures as low as possible.

In conjunction with the new wheel dimensions and double-joint front axle design, this concept allows the use of large brake pistons and both large and thick brake discs.

The result is maximum reliability with virtually no fading. The brake linings are asbestos-free. The special attachment of the brake linings ensures that they can always move freely even when subject to extreme corrosion. The handbrake is of the dual-servo type.

The ABS anti-lock braking system has been further improved, the ABS control unit now being housed in the electronic box.

A larger share of the brake power goes to the rear axle in order to provide the shortest possible stopping distances. The handbrake lever is fitted on the driver's side of the centre console, not in the middle.

Wheels and tyres

The 15" wheels have a tyre height/width ratio of 65% and, respectively, 60 %. This provides the following advantages:

- sufficent room for accommodating extra-large brake discs and callipers
- ample room also for the various suspension units, thus providing an advantageous kinematic arrangement
- sporty handling, high speeds in bends and accurate steering without detracting from the car's motoring comfort and ease of control even when aquaplaning
- good behaviour and high speeds and a long running life

Driving characteristics

The measures and modifications described so far improve the car's driving characteristics in numerous respects:

- Superior driving stability, behaviour of the car largely immune to varying road surfaces, weather conditions and mistakes made be the driver
- Controllable and predictable response of the vehicle when changing load
- Good directional stablility and very accurate steering, particularly at high speeds
- Effortless handling on road surfaces with both a high and low frictional coefficient
- Easy to control even in extreme situations
- Good handling up to very high extreme limits plus outstanding performance
- Very good traction also in winter
- Optimum ergonomics on the driver's seat and minimum fatigue for the driver both on long distances and at high speeds
- Slight understeer regardless of the load the car is carrying and the radius of a bend

- Powerful brakes without fading
- Minimum movements of the body when accelerating, braking and driving round bends
- Minimum vibrations and low noise (very little rolling noise of wheels)

Bodywork

In designing the bodyshell of the new car, BMW's objective was also to achieve a high standard of bending and torsional rigidity in conjunction with the bonded windscreen and rear window, while nevertheless keeping the weight of the vehicle at a minimum. The task, therefore, was to achieve a harmonious blend of good streamlining on the one hand and road safety plus motoring comfort on the other.

Other objectives were to achieve a high standard of passive safety going beyond legal requirements, ease of repair at the workshop and, as a result, a low rating for insurance premiums . At the same time the bodyshell had to be prepared not only for a long-wheelbase version, but also for the different requirements in various countries.

Bodyshell design and construction

The bodyshell was conceived and designed with the help of the finite-element method (FEM) and modal analysis. Rigid profiled cross-sections, rounded-off transitions, stiff intersections and bonded windows serve to optimize the flow of power throughout the body and load-bearing components. Various body parts were furthermore integrated to form large single-piece components for production in one process.

The number of welding points and the length of solder and welding seams has been kept at a minimum thanks to elaborate examinations and studies.

The long-wheelbase version has an extended side-frame at the rear door cutout as well as longer supports at the side (doorsills inside the car). The doorsills are additionally reinforced in this area in order to provide optimium torsional and bending rigidity.

The spare wheel pan in the luggage compartment floor is designed to accommodate a full-sized spare wheel lying down flat.

Windows

Both the windscreen and rear window are bonded on to the body. They therefore act as load-bearing components and increase not only the torsional rigidity of the bodyshell but also its rollover stability. The flush transitions from the windows to the body of the car also offer advantages in terms of both styling and streamlining. The joint between the windows and the bond is determined accurately and harmoniously by way of contact points. The rake of the windscreen is 59^{o}, the rake of the rear window 62^{o}. Visible window area amounts to just under 3 m^2 (32 sq ft). Green heat-insulating glass comes as standard.

The windscreen features a heated area at the bottom, heating wires being integrated in the glass itself. This serves to heat the windscreen wipers when not in use. The rear-window heating is controlled accurately for maximum efficiency but minimum power consumption: After being switched on the rear-window heating initially works at full power (280 W) to rapidly remove ice and misting. After 10 minutes the heating is automatically switched down to lower power (approx 90 W) until the driver switches off the ignition. A yellow telltale in the rear-window heater switch shows the driver that the heater is on maximum power for rapid de-icing.

The new 7 Series is fitted as standard with an aerial integrated in the rear window.

Lids and doors

The engine compartment lid is hinged at the front and supported by two gas-pressure springs. This provides good access for all repair and maintenance work. The engine compartment lid is raised upwards at the rear to cover the windscreen wiper shafts and, accordingly, provide an even higher standard of road safety. The luggage compartment lid is also supported by gas-pressure springs and features new hinges allowing the entire lid to be easily removed for repairs, etc.

The doors feature windows flush at the outside, frames flush at the inside and a completely new three-piece sealing system. The outer seal closes the doors flush with the outer skin of the body. When the windows are moved up the sealing tab is automatically pressed against the glass and holds the windows in position. The main seal keeps the door tight against the body, preventing water and even air (soundproofing) from getting in.
With the door closed, the main seal rests as a kind of "lip" on the smooth door cutout. The inner seal serves to cover the joint between the door frame and the body of the car, at the same time enhancing the soundproofing to an even higher standard.

Rustproofing

Specific measures for optimum rustproofing were taken from the very beginning, even when developing the initial concept of the car's body. As an example, the body features a large number of holes and openings for letting through fluid in the cataphoretic dip bath (CDB). Nothing can rub on the body during the dip bath process and the fluid cannot accumulate anywhere. Body panels are zinc-plated either on one or both sides wherever necessary. Surfaces subject to stonethrow are protected by PVC and plastic (wheel arch and side-sill covers). All hollow cavities are properly sealed and the entire underfloor of the vehicle is treated with a special preservative.

Body Features

The interior has been completely redesigned. The main objective was to ensure excellent perception and optimum operation of all controls and instruments, to make the interior clear and spacious in its appearance and to provide an attractive design of all visible parts and components. First and foremost, however, the No 1 target was to optimize the ergonomics of the interior in general and the cockpit in particular, improving everything from the overall concept to the individual details.

Instrument panel/consoles

The instrument panel and consoles are finished with a pleasant-to-feel and soft skin almost identical in appearance to genuine leather. This also minimizes the amount of softeners able to escape from the skin (which otherwise cause fogging).

The glove compartment features an off-centre catch and lock for easy access from the driver's seat. After being opened the glove compartment can be pulled out horizontally by about 200 mm (7.9") and swivelled towards the driver by 11^{o} by means of a new swivel-opening pivot.

An additional stowage compartment (with lock and built-in section for cash and small change) is provided on the other side of the driver's seat (at the left on LHD cars). The centre console with the handbrake on the driver's side houses a stowage and cassette box. At the bottom the centre console is finished with an all-round leatherette cover.

Surface linings

Both the front and rear door linings feature an integral armrest with built-in door handle. A stowage box is integrated at the front, an ashtray at the rear. The upper and lower halves of the instrument panel are separated by a wide wooden strip that continues on around the doors. The roof columns are

finished in fabric of the same type as the roof lining itself. The roof grab handles with springs and rubber buffers are fitted flush in the roof lining. The carpet is of velour quality with foam-type sound-deadening mats. The parcel shelf comes in the same fabric lining as the roof. The luggage compartment is padded in velour needle fleece and features a fleece floor carpet with heat-insulating effect.

Seats

The seats are ergonomically designed for safe and relaxed motoring and can be easily adjusted to various positions.

The seat cushions at the front are made of multi-zone PU foam with steel base springs. The foam core is of varying thickness to provide spring and damping behaviour in accordance with anatomic requirements. The newly developed seat frame is adjustable for height and the driver's seat features an additional tilt angle adjustment. The range of adjustment for height is 60 mm (2.4"), fore-and-aft adjustment is 212 mm (8.4").

Manual seat adjustment is by three levers (driver's seat) fitted on the side of the seat itself. The front lever is for separate angle adjustment, the middle lever serves for fore-and-aft adjustment, and the rear lever is for height adjustment. All three levers can be set parallel to one another for maximum seating comfort.

The electric seat adjustment available as an optional extra incorporates new, ergonomically designed switches shaped like the seat bottom and backrest and fitted on the outside of the seats.

The seat and mirror memory is another optional extra: Using this sophisticated system, the driver can choose three settings for each of the five adjustment functions (fore-and-aft, height, backrest, angle, headrest). Each seat position is memorized in conjunction with the desired position of the two rear-view mirrors. The switches for memorizing and retrieving seat

positions are integrated in the seat console on the outside. Operation is by four buttons, one of which serves as the memory button, the three others as retrieval buttons. Given their convenient location and fingertip control function, the buttons allow the driver to select the desired seat position immediately after opening the door (ie, before sitting down).

Rear seats

The rear seats are also new in design and are made entirely of PU foam. Here again, the foam core is carefully designed and structured to provide suitable spring and damping action. A centre armrest with stowage box comes as standard.

Locks and fittings

Featuring no less than 12,000 different settings, the new four-web key provides a very high standard of security. Central locking with opening catches on the driver's and front passenger's doors and luggage compartment lid comes as standard. The central locking system may be activated from both the driver's and front passenger's doors: Once engaged, the central locking secures the door lock buttons and mechanism to reliably avoid tampering from outside. The position of the key with the central locking activated is vertical, the locks being opened by turning the key to the left. In the event of an accident with the central locking engaged, the crash sensor will automatically unlock the doors and switch on the hazard warning flashers.

Holding the key tight in the central locking position, the driver can conveniently close all windows and the electric steel sliding/vent roof (optional extra) one after the other, even with the doors already locked. Safety circuits ensure that the central locking cannot be activated by mistake, trapping the passengers inside the car.

Electrical System/Electronics

Additional and even more sophisticated electrical and electronic systems are used on the new 7 Series to provide extra functions with an enhanced standard of quality and reliability. New concepts have been developed, for example, for the headlight and illumination system, for the windscreen wash/wipe, for anti-theft protection and for the modular instrumentation.

Headlights/lamps

Headlights

The low-beam headlights and foglamps feature ellipsoid technology for the first time ever on a production car. Advantages are the excellent illumination of the road ahead, particularly at a range of about 50 metres, an increase in light intensity by 30 % over the headlights used so far and far more distinct light/dark contours. The ellipsoid headlights excel above all through the following design features:

- The ellipsoid reflector replacing the paraboloid reflector.
- A second diaphragm to form the light/dark contours instead of the conventional cover inside or in front of the bulb.
- A collector lens for providing a broad light beam in conjunction with the light/dark contours generated by the diaphragm.
- A scatter lens made of heat-treated pressed glass with an integrated scatter opening.
- The option to use H1 halogen bulbs (previously H4) in order to minimize tolerances of the light/dark contour line.
- Parking lights integrated in the low-beam headlights behind a scatter lens in the diaphragm.

The entire concept is comparable to a slide projector, the diaphragm representing the slide and the "picture" being cast on to the road ahead.

Automatic headlight range adjustment is available as an optional extra.

Direction indicators

The front direction indicators are located next to the headlights. The glass cover is fused on to the reflector, bulbs being exchanged directly from the engine compartment.

The rear light clusters (also with a fused cover connected directly to the reflector) provide the following arrangement of the individual lights:

- Direction indicator in upper outside corner
- Large tail light beneath direction indicator
- Stop light with diagonal subdivision next to tail light
- Reversing light
- Rear fog warning light at the inside

Interior lights

The main interior light is fitted in the roof lining at the front centre between the sun visors. Two directional reading lamps are fitted additionally at the outside and may be switched on and off separately from the 735 i. Two further interior lights are fitted at the rear on the C-pillars.

From the 735 i, footwell illumination (directed to both the inside and the outside) is integrated in the door linings at the bottom front.

The interior light is switched on by various functions via

- door contacts (door open)
- door handle switches (door handle pulled up)
- ignition lock (turned to 0, provided at least the parking lights have already been switched on)
- crash function (when opening the central locking).

Windscreen wipers/windscreen wash/wipe

The new 7 Series features windscreen wipers with speed-related pressure control in order to provide excellent wiper quality under all driving conditions and, as a result, an even higher standard of active safety.

The optimized wiper kinematics and wiper blades measuring 600 mm (23.6") in length cover an area of 87 % of the total windscreen.

The innovative wiper pressure control deserves special mention: The wiper shaft on the driver's side is hollow. A second shaft running inside this hollow shaft can be adjusted by an actuator, thus being raised and lowered in axial direction. These piston-like movements are conveyed by a lever integrated in the wiper arm. The spring force thus generated presses the windscreen wiper on to the windscreen with varying pressure as a function of road speed: Pressure is controlled in four stages as speed increases, being taken off completely in park position in order to preserve the wiper blades. Another feature is the speed-related intermittent wipe.

A high-pressure washing system for the headlights and, as a first-ever achievement, for the foglamps is also available as an optional extra. The washer jets are located on top of the bumper (one dual jet on each side for the high and low beams), a single jet for the foglamps being fitted at the bottom of the bumper. This washer system is operated automatically with the windscreen wipers when the lights are switched on.

Instruments

The instrument cluster is of modular design.
The rev counter and speedometer are located in the middle. The LCD-technology mileage and trip counter are on the left next to the alphanumeric Check/Control display in the driver's primary line of vision. The Service Interval Indicator is beneath the integrated visual display of the Check/Control. Two individual displays come together with the

automatic transmission, the left-hand display showing the electro-hydraulic automatic transmission control programme, the right-hand display the selector lever position. The main telltales for the high beam, direction indicators, trailer direction indicators, battery charge and oil pressure are located between the instruments at the top and bottom, ensuring good visibility for the driver.

Check/Control

Serving as an active information system, Check/Control informs the driver through the alphanumeric display in the primary cockpit section of any deficiencies of important functions and any other warnings or instructions of which he should be aware.

Priorities are attached to the individual functions in accordance with their significance, being shown in visual form where necessary. Warnings are highlighted by a sound signal in addition to the visual display, which also flashes on and off in this case. This allows the system to give the driver a wide range of helpful information where necessary, without however confusing him through a large array of lights and telltales.

Defects of high priority - ie, with an immediate influence on driving safety - are shown to the driver through a constant printed message with a triangular warning sign flashing on and off. Deficiencies with no immediate effect on driving safety are shown by a printed visual message for two minutes after the key has been turned in the ignition. Further deficiencies are shown by a printed message appearing on the screen for 20 seconds when the car is not moving, in each case when the ignition is switched on or off.

Bulb control module

This module serves to monitor the vehicle illumination and stop light power circuits and their on/off position. The driver will therefore be informed immediately via the Check/Control when a bulb is deficient. Since interruptions in the power circuit leading to and from the module are also reported regardless of the current operating mode, the system ensures constant supervision with the lights both on and off. To enhance the functional safety of the entire system the stop light switch is supervised by a second test switch.

On-board computer

The new on-board computer fitted as standard from the 735 i processes the signals generated by the individual vehicle systems, modules and sensors and presents the driver with information compiled in this way both via the computer itself and in the alphanumeric display.

The on-board computer comprises the following functions:

- simple input mode
- programming of various functions
- diagnostic facility
- 1 computer, 6 language versions and 6 language displays
- compact broad-format design
- programmable remote control
- hour signal with display in on-board computer (sound symbol)
- new gong for outside temperature warning (different sound)
- time function with second output for auxiliary heating/ventilation (optional extra) and timing with stop-watch function
- automatic switch-over from auxiliary ventilation to heating as a function of outside temperature (switch-over point $16^{o}C/61^{o}F$)
- maintenance of code even after battery has been disconnected

- code with updating facility
  (The word "Code" in the display and a gong signal shows the driver that the code function is triggered when turning the key in the ignition.)
- parallel display in the instrument cluster (alphanumeric) with additional information
- display of current road speed for proper observance of speed limits

Anti-theft warning system

When activated, the anti-theft warning system (optional) monitors not only all doors and lids but also the rear window, radio, glove compartment and the battery fitted beneath the rear seat.

It also supervises the ignition lock in "Radio" position, the alternator voltage, vehicle-to-earth connection, vehicle movements and manipulations.

The anti-theft warning system is activated and deactivated via the lock either on the driver's and/or the front passenger's door. The luggage compartment may be activated and deactivated separately via the luggage compartment lock and is therefore independent of the activated anti-theft warning system for the passenger compartment. Activation of the system is indicated by a light-emitting diode. If any of the doors, lids, etc included in the system are not properly closed, the driver will be informed by the diode flashing on and off for 10 seconds. Subsequently the anti-theft warning system is activated.

The system is deactivated by the unlocking and security deactivation function on the front doors. When deactivated within 36 hours the LED will go off immediately; when deactivated after 36 hours, the LED will briefly flash to indicate the activation. Should an unauthorized person have tampered with the car, the LED will constantly flash on and off to inform the driver accordingly.

Central body electrics

A new modular system comprising all electronic components has been developed to enhance the functional reliability of all electrical units. The "heart" of this central body electrics is the basic module which controls all functions integrated in this system.

As already mentioned, windscreen wiper pressure is controlled by a force adjuster on the wiper arm fastening on the driver's side, thus being increased and decreased as a function of road speed. Pressure is automatically removed from the wiper blade in park position with the ignition switched off.

The various functions of the central locking have already been described in the context of the car's body, fittings and appointments.

To operate the electric window lifts (standard) and the electric steel sliding/vent roof (optional), all the driver or passengers have to do is briefly touch the respective control button. The function desired (opening or closing) will then take place automatically until the window or sunroof reaches its final position.

The central locking, electric window lifts and electric steel sliding/vent roof are electronically secured by a power fuse automatically triggered in the event of an overload. After a delay of about one minute, the electronic control unit will automatically switch on again, check whether the functional deficiency has been eliminated and, if so, maintain the power circuit. If there is still an overload the control unit will switch the circuit off again.

The interior illumination is also controlled by the central body electrics: when opening the outside door handle on the driver's door, when turning the key to the "off" position in the ignition with the parking or driving lights switched on, and when the central locking is deactivated by the crash

sensor. When switched on through one of these processes, the interior light will remain on for a definite, predetermined period. A repeater lock ensures that the light cannot be switched on in this way more than two times in direct succession. The maximum time the light may remain switched on, even if the door is not properly closed, is limited to about 16 minutes.

The door lock heating (standard from the 735 i) is actuated via the outer handle on the driver's door (with repeater lock). It is switched off as soon as the central locking is deactivated and the door opened.

Elaborate, newly designed connectors have been used all round for maximum reliability of the entire electrical system. Progressive microprocessor technology with comprehensive diagnostic abilities and emergency operation/redundancy functions ensures a high standard of all-round quality and dependability.

Virtually all functions and components driven by electric motors (eg window lifts, steel sliding/vent roof, windscreen wiper pressure control) are protected by power potential fuses: Power-consuming items are secured against permanent operation (for example in the case of a defect in the load circuit) by a transition to another relay ensuring that the motors can still be operated. All inputs and outputs are short-circuit-proof and individually designed to eliminate the risk of confusion.

Air Conditioning

In developing the heating and ventilation system BMW's engineers sought above all to provide an individual and independently adjustable fresh-air supply with temperature control (for the first time ever in automotive engineering), to develop a system with separate left/right temperature adjustment in the passenger compartment, and to make the heater and

ventilation controls simple and easy to use. Conditions inside the passenger compartment were to be optimized in both subjective and objective terms by a good throughput of air irrespective of road speed and exact adjustment of air distribution to meet the needs of the driver and his passengers.

Heater (standard on the 730 i and 735 i)

The compact heater with exactly the same dimensions as the automatic air conditioning is controlled through the water circuit. It features a two-piece heat exchanger with two feed pipes and one reflow pipe for separate left/right temperature control. The temperature inside the passenger compartment is set automatically by the electronic control unit operating through two magnetic valves, two temperature adjusters, the interior heat exchanger and outside temperature sensors. Ventilation temperature with the heater switched on may be set individually over and above this electronic control system. The air distribution flaps are adjusted by 6 actuators operated by push buttons in the control console. Blower speed is infinitely adjustable. Air volume in the blower may be reduced infinitely via the air volume selector knob and fresh-air flaps. Operation of the defrost button will automatically adjust the blower to maximum output and the heater to maximum heat (only up to $0^{o}C/32^{o}F$), all the air then flowing through the defroster nozzles: the footwells and ventilation flaps will remain closed.

Automatic heating/air conditioning

The automatic air conditioning features a wide range of additional functions over and above the standard heater.

With this automatic control programme, the left and right (driver and front passenger) air distribution flaps are adjusted automatically and independently of each other to provide optimum air conditioning on either side in terms of air flow and direction. When cooling, for example, cold air flows out of the ventilation grilles while in the heating mode warm air flows

down into the footwells. When cooling down or heating up in very hot or cold weather, the air volume is increased accordingly.

Air distribution may also be adjusted individually on the left and right by way of two additional programmes, should the driver or front-seat passenger not be content with the automatic programme. This will not influence the temperature and air volume control.

In the defrost programme air is automatically directed at the windscreen on both sides, blower speed is increased to maximum output, and the blower temperature is either set to maximum heat if the outside temperature is below $0^{o}C$ ($32^{o}F$) and the coolant temperature below $30^{o}C$ ($86^{o}F$) or controlled individually if the outside temperature is above $0^{o}C$. The compressor for drying the air and the auxiliary pump will both be switched on at the same time, and the rear window and windscreen heating will be activated.

Air throughput is controlled as a function of road speed. From a speed of 60 km/h (37 mph) the fresh-air inlet opening will decrease in size from 100 % to 40 % at 140 km/h (87 mph). Blower speed is also controlled as a function of hot air/cold air output at road speeds from 10 km/h (6 mph) to 60 km/h.

Up to a heat exchanger temperature of $30^{o}C$ air flows exclusively through the defroster nozzles regardless of the programme selected (with the exception of the defrost setting). The blower will operate at minimum speed irrespective of the output stage selected on the scale. The auxiliary water pump will not come on until the heat exchanger temperature exceeds $30^{o}C$, air then being distributed in accordance with the programme buttons pushed. Blower output will then also adjust automatically to the volume stage chosen.

Stand-by ratings are automatically provided in the event of failures involving the controls, the "brain" of the system and the sensors, thus maintaining an adequate standard of driving safety and comfort.

Control unit

The control unit is fitted behind the heater/air conditioning box from where it may easily be removed for repair or maintenance. It serves not only to control the temperature inside the passenger compartment but also to set the flaps to the desired positions. This is done as a function of the programme chosen and in accordance with the output volume selected, which is crucial to the volume of hot and cold air flow.

The "heart" of the system is the temperature control for the passenger compartment consisting of a main control circuit and two auxiliary control circuits. The flow of water through the heat exchangers operating separately on the right and left is controlled by two stroke valves via the two auxiliary circuits.

Controls

Heater

The heater is controlled by a combination of rotary knobs and push buttons located conveniently for the driver in the instrument panel. The rotary knob for infinite adjustment of the heater fresh-air flaps and exact control of the blower speed is located in the middle. Air throughput in the passenger compartment can therefore be adjusted to meet individual requirements.

In position 0 the blower is switched off, the fresh-air flaps are closed and the function illumination is switched off.
Rotary knobs for infinite adjustment of the temperature for the driver and front passenger are located at the left and right next to the blower control. In positions "max" and "min" on the driver's side the electronic temperature control is bypassed and the water valves are fully opened or, respectively, closed, also overriding the separate control on the front passenger's side.

An interior temperature sensor supplied with air by an electric blower is fitted behind a panel between the rotary knob for blower speed and the right-hand temperature selector knob. The sensor can therefore determine the temperature inside the passenger compartment without being influenced by the surface temperature or the temperature of individual parts and components.

The air distribution buttons are located at the top of the button panel and may be operated individually or together (subject to certain combinations required for reasons of driving safety). The defrost button is directly beneath. When pushed, it overrides all air distribution programmes, switches on the defrost programme, increases blower speed and controls the temperature according to current requirements.

All controls are illuminated for optimum clarity and the push buttons have a green switch-on telltale which comes on as soon as they are operated.

The push button for the rear window heating is at the far left. When operated it generates maximum heater output for 10 minutes, then reducing the output to one-third.

A knurled wheel for infinite adjustment of the ventilation temperature is located separately between the two centre grilles. While the ventilation temperature may be selected independently of the temperature chosen inside the passenger compartment, it cannot be set warmer than the air outlet temperature at the defroster nozzles or front footwell nozzles.

Automatic heating and air conditioning

The automatic heating and air conditioning control unit is a combination of selector knobs and push buttons. A profiled intermediate panel with air inlets for the passenger compartment sensor provides separate control for the driver and front-seat passenger.

The rotary knob for infinite adjustment of blower speed and infinite opening of the fresh-air flaps is located in the middle. Right below it comes the three-piece control console for the defrost, air conditioning and air recirculation programmes.

All controls are illuminated for optimum clarity. The push buttons have a green switch-on telltale which comes on when the buttons are pressed. As with the heater, the interior sensor is located behind a grille and supplied with air by a small blower. The button for the rear window heating is located at the left of the driver's control console. The rear window heater itself operates in exactly the same way as with the standard heating system. Ventilation temperature is also controlled in the same way as with the standard heater.

Ducts and nozzles

Two defroster nozzles point towards the windscreen and operate in conjunction with the windscreen wiper heating. Additional defroster nozzles for the side windows are fitted in position at the top of the front door panels. Temperature-controlled air (or cooled air with the automatic air conditioning) flows into the passenger compartment through four ventilation grilles. The indirect head-level ventilation nozzle is located in the middle of the instrument panel at the top (only with the heater). Footwell nozzles designed to provide a broad flow of air are provided at both front and rear. An additional outlet either for untreated or cooled (automatic air conditioning) air is located in the propeller shaft console.

Vehicle Safety

In addition to the numerous measures taken to enhance driving safety and fatigue-free motoring conditions, an important objective in developing the new 7 Series was to further improve passenger safety during and after a collision. This objective has been reached by suitable improvements and modifications of the bodyshell, appropriate design features (visibility) as well as innovations of the seat belt system.

Vehicle body

Bodyshell structure

The bodyshell is designed for minimum damage and deformation with a maximum amount of impact energy being absorbed by the vehicle. The windscreen wiper shafts are covered by the engine compartment lid in order to reduce the risk of injury for pedestrians and bicycle/motorcycle riders. The engine compartment lid itself is secured by safety hooks in the region of the wind rail, ensuring that the lid cannot be forced through the windscreen in the event of a head-on collision. Smooth and rounded-off body contours, particularly at the front of the car, also help to offer other - unprotected - people on the road a higher standard of safety.

Large supports and reinforcement members in the side-sills, the stable interaction of doors and roof columns, the rounded-off transition of the A-pillar at chest level, equally rounded-off corners on the B- and C-pillars leading to the side-sills, the one-piece side frame and load-reducing transitions from the engine support to the floor assembly help to make the passenger compartment extremely stable and rigid.

Front section

Passive passenger safety, safety for other people on the road and minimization of damage in the event of accidents at low speeds have been combined to provide an optimum standard unprecedented in automotive engineering.

- Passenger safety

  Passenger safety is determined by the quality of the seat belts, airbag, seats, interior design and planned deformation of the front body section.

  The magnitude and features of the retardation effect in a head-on collision as a function of vehicle deformation are referred to as the crumple behaviour of a car. This has a significant influence on the forces acting on the passengers.

The crumple behaviour of the new 7 Series provides a low level of acceleration averaging only 15 g in a head-on collision at approx 50 km/h (31 mph) against a solid wall or barrier. As a result, the passenger safety system substantially exceeds even the strict US safety standards currently in force, keeping the passenger cell stable for maximum safety and protection. The steering column is forced back by only one-fifth of the allowable margin in the event of a head-on collision, thus providing maximum safety for the driver.

- Safety for other people on the road
  With vehicles on our roads being very heterogeneous and varying most substantially in their features, light vehicles have inevitable physical disadvantages in collisions with other cars and trucks. This is further aggravated by the fact that heavy vehicles usually have stronger and more rigid front sections. With their long deformation travel at the front, on the other hand, the 7 Series keep deformation energy at a relatively low level, ensuring that energy is absorbed even in collisions with lighter vehicles. This reduces the risk of injury also for other motorists and people on the road.

- Reduction of the cost of repair
  To keep damage and repair costs at a minimum, BMW has developed an impact-absorption system far superior to all conventional concepts.
  The bumper system consisting of an aluminium support with plastic cover and two hydraulic energy absorbers, can withstand parking collisions up to 6 km/h against solid obstacles without damage. At higher speeds energy is initially absorbed by two easily replaceable impact boxes connected to the bumper system. Deformation of the engine supports can therefore be avoided at speeds of up to 15 km/h, depending on the obstacle hit by the car.

Should the kinetic energy generated in a collision exceed the capacity of the bumper system and impact boxes, the engine supports will be deformed only at the front end where they are easy to repair. Increasing deformation of the front section then absorbs the greater energy generated at higher collision speeds, always keeping damage at a minimum depending on the severity of an accident.

Interior

The entire interior is finished with soft materials and energy-absorbing surfaces to protect the driver and passengers. The seats have an extra-stable frame and are very stiff at the sides. They also feature integral hip support at the front and an integral belt lock.
The A-pillars and propeller shaft tunnel are linked by a load-bearing tube. The steering column is supported by the propeller shaft tunnel to remain in position with minimum distortion in the event of a head-on collision.

Seat belts

The seat belts are automatically adjustable for height (B-pillar) as a function of fore-and-aft adjustment of both the driver's and front passenger's seats, thus providing optimum belt geometry for persons of all sizes.

A new, ergonomic (inverted) belt system at the rear enables the passengers to lock and unlock their belts with one hand, as on the front seats. Another advantage is that nobody can sit directly in front of or on the belt lock. The crucial point, however, is the excellent geometry of the hip and shoulder belts providing maximum efficiency and minimizing the risk of injury. This concept provides added protection in side-on collisions by the shoulder belt giving passengers greater lateral stability and restricting sideway movement to the inside: The heads of the rear-seat passengers cannot crash together due to a side impact.

The centre hip belt at the rear rolls up automatically when not in use.

The special safety system available as an option comprises an airbag on the driver's seat and a belt tightener for the front passenger.

In conjunction with the excellent visibility of the new 7 Series, these modifications provide a substantial improvement of the high standard of safety already offered by large cars.

The BMW 12-cylinder: In a class of its own

Just 10 months after the launch of the new 7 Series, BMW's new flagship is now also available - the 12-cylinder. These two models - the 750i and the 750iL long-wheelbase version - come in a class of their own in every respect. A revolutionary concept that already became evident on the drawing boards, in vehicle development, with the stylists, chassis engineers and engine specialists, has now become reality: BMW has created a completely new car truly outstanding in its individual features and overall quality. A car that combines all the benefits of a unique saloon with an equally unique engine offering unprecedented smoothness, power and motoring refinement.

The 750i does not attempt to deny its close relationship with its 730i and 735i 6-cylinder counterparts. The fine difference is shown, however, by the larger range of standard features. Particularly the front end of the car, the "face" of the 12-cylinder, catches the eye: The BMW "kidney" grille and the power bulge on the engine compartment lid are much wider in order to meet the greater cooling requirements of the larger engine, at the same time adding further emphasis to the dynamic elegance of the 12-cylinder. The exhaust tailpipes are another sign of distinction, showing the difference between the 6- and 12-cylinder 7 Series: On the 750i the tailpipes are square, once again taking up the symbol of the "kidney".

The long-wheelbase version (750iL/735iL) is not just 114 mm (4.5") longer, but also looks even sleeker and more graceful, thus providing even more convenient access and exit from the rear as well as a further increase in space for the rear-seat passengers. The long-wheelbase model nevertheless retains that unique characteristic of the new 7 Series confirmed by car connoisseurs everywhere: It combines the dimensions (or, to be more precise, the interior dimensions) of a luxury saloon with the handling of a compact car, ensuring that even this BMW lives up fully to BMW's motto of sheer driving pleasure.

The BMW 750iL comes as standard with four-speed automatic transmission, a new high-pressure washing system for all headlights and an intensive screenwasher system, a heated rear-view mirror on the offside door as well as infra-red remote-control of the central locking. Other standard features of the 750iL are the all-leather finish of the interior (leather in various colours also on the doors, lower facia panel and consoles), the electric seat adjustment for the driver (with memory function) and front-seat passenger, the unique automatic air conditioning (also standard on the 750i) with separate temperature control and air distribution on both sides of the car, pre-programmed auxiliary ventilation, electrically adjustable rear seats with individual body contour, rear-seat head restraints that move up automatically when a passenger enters the rear, rear-seat reading lights and a sunblind on the rear window. Self-levelling rear suspension, Servotronic, specially cast wheels and a new on-board computer are further standard features on both the 750i and 750iL.

Now, however, let us consider the "heart" of the car, the world's first 12-cylinder designed and built for use of a catalytic converter. Introducing this legendary engine concept, BMW is taking exactly the right step at exactly the right time. The engine combines BMW's philosophy of small moving masses (relatively small cylinder units mean low piston weight and, as a result, supreme running smoothness) with all the refinements of modern technology. The BMW 12-cylinder therefore fulfills all the requirements made of a truly outstanding engine that represents a class in itself: it provides superb power and performance, ensures particularly compact dimensions and offers proverbial running smoothness. In addition, it offers convincing answers to the question of fuel economy and clean emissions. Last but not least, everybody who has had the opportunity to behold the clearly arranged and uncluttered engine compartment will confirm that the BMW 12-cylinder looks just as stylish as it performs.

A few comments on the engine's technical features: The cylinders are in V-arrangement at an angle of 60^{o}. The aluminium crankcase contributes significantly to the unrivalled low weight of only 240 kg (529 lb). The fuel mixture and supply are completely separate for the two rows of cylinders - incorporating, for example, two separate engine management systems.

The forged crankshaft runs in 7 bearings and has 12 counterweights. The pistons are made of aluminium. Valve clearance between the rocker arms and the two camshafts is compensated hydraulically. And all this is controlled, supervised and master-minded by an engine management system featuring the most advanced electronic control units.

The most important specifications: 4988 cc, 220 kW/300 bhp at 5200 rpm with and without catalytic converter. And to make sure that everybody can really imagine the overwhelming power of the white-and-blue 12-cylinder, maximum torque is 450 Nm (332 ft/lb) at 4100 rpm. On the road this means acceleration to 100 km/h in 7.4 sec and a top speed of 250 km/h or 155 mph (while the car would have been able to achieve an even higher top speed, BMW has chosen this limit imposed by an electronic speed governor).

Two of the many options available for the 12-cylinder are Automatic Stablility Control (ASC) for monitoring wheel spin and Electronic Damper Control (EDC).

Everything else is the BMW 7 Series at its very best, representing the epitome of dynamism, elegance, innovation, quality and comfort. Naturally, this applies particularly to the 750i and 750iL.

Technical Features of the BMW 12-Cylinder Power Unit

Objectives

The objective in designing and building the new 12-cylinder power unit of the BMW 750i was to introduce progressive engine technologies in the top class of automotive engineering.

This meant fulfilling the highest standards in terms of

- performance
- compact dimensions
- economy
- emission control

The results achieved in this process are truly outstanding compared with any other engine anywhere in the world.

Weighing a mere 240 kg (529 lb) overall, the 5-litre V 12 light-alloy engine sets a new standard also in terms of weight minimisation.

Developing 220 kW (300 bhp) at 5200 rpm, a specific output of 44.1 kW (60 bhp) per litre and a maximum torque of 450 Nm (332 ft/lb) at 4100 rpm, the BMW 12-cylinder is superior to any other comparable engine in the market (even engines without emission control).

The BMW V 12 also sets new standards in terms of motoring refinement, quietness and the performance:fuel consumption ratio.

BMW's engineers have reached these objectives by applying the most advanced technologies and consistently using innovative ideas.

Description of individual engine components

Crankcase

The basic requirement made of the BMW 12-cylinder power unit was to combine optimum functional efficiency with low weight. Accordingly, the crankcase had to made of aluminium (AlSi17Cu4Mg). In their main dimensions the two rows of cylinders resemble the 2.5-ltr engine of the BMW 325i (bore 84 mm/3.31") and are arranged relative to one another at a V-angle of 60°. The cylinder liners are prepared in a special etching process that exposes the hard silicon crystals which then provide a low-wear combination of materials in conjunction with the iron-coated pistons.

Crankshaft

The forged extra-rigid crankshaft resistant to torsional and bending forces features cranks at intervals of 120° and runs in 7 bearings. The stroke is 75 mm (2.95"). The 12 cranks serve as counterweights and thus provide an efficient mass balance. The inherent advantages of small oscillating masses and a smooth torque curve thanks to small firing intervals further enhance the high standard of motoring refinement offered by the BMW 12-cylinder. An important contribution is made by the elaborate choice of bearings and their tolerances in several selection processes. This accuracy in production ensures consistently small bearing tolerance on the crankshaft and connecting rod bearings of all engines.

Pistons

A special feature of the pistons is the trapezoid recesses in the piston crowns. These recesses or troughs form part of the combustion chambers providing an increase in volume towards the spark plugs in the middle as well as compact combustion chamber contours. This, in turn, provides short flame travel and complete combustion of the fuel/air mixture for optimum efficiency.

Connecting rods

The connecting rods are basically the same prior to finishing as on the 2.5-ltr engine, the only modification being on the outer surfaces of the large openings due to the specific position of the rods in the V-engine.

Cylinder heads

The absolutely identical cylinder heads with very small valve angles and vertical intake ducts are designed, like the pistons, to provide a good cylinder charge and, accordingly, a high degree of combustion efficiency.

The overhead camshafts are driven by one single roller chain. Valves are controlled by rocker arms with hydraulic valve clearance compensation requiring no maintenance.

Ancillary drive systems

Forming two separate groups, the air conditioning compressor/engine fan, on the one hand, and the alternator/hydraulic pump, on the other, are driven by poly-V-belts. This subdivision provides the compact design envisaged from the outset. Poly-V-belts also provide a very small rotational radius and minimise deformation in both bending directions. These properties are put to maximum use with the help of hydraulically actuated tightening rollers providing consistent V-belt tension.

Cooling system

The cooling system is designed to provide a constant longitudinal flow through the crankcase and cylinder heads. This flow of coolant ensures a largely symmetrical temperature distribution throughout the cylinder heads and the entire crankcase.

Provision has been made for fitting an electric coolant heater as an option. As with all BMW engines, the temperature of coolant upon entry is controlled by a thermostat.

Lubricating system

The extra-quiet inner-wheel tandem pump and the optimum position of both intake manifolds in the oil sump ensure a reliable supply of pressurized oil without foam even under extreme conditions. This is indeed essential for the proper functioning of the hydraulic valve clearance compensation.

One special feature is the installation of the full-flow oil filter relatively far away from the engine: The use of pressure hoses to connect the oil pump and oil filter allows the filter to be located at an easily accessible point in the engine compartment. An oil cooler controlled by thermostat consistently matches the cooling effect to the respective running conditions.

Intake system

To reduce noise emissions the symmetric intake manifolds with equally long oscillating pipes for all 12 cylinders are disconnected from the cylinder heads through elastic mounts. The injectors are integrated in the intake system. One throttle butterfly of the Electronic Output Control (EOC) operated by a step motor and one hot-wire air mass meter, respectively, are fitted at the front ends of the intake units. Intake air is supplied separately to the two rows of cylinders through a plate air filter on either side.

Engine electronics

The BMW 12-cylinder engine features the 3rd generation Motronic introduced together with the new 7 Series. Here, however, there are two Motronic units - one for each row of cylinders - specially tuned to the requirements of the new engine. The electronics perform the following functions:

- Grid-controlled ignition
- Grid-controlled fuel injection

- Maintenance of the $\lambda = 1$ air/fuel ratio for running the engine with a catalytic converter
- Idle speed control considering engine-specific parameters (including wear) and running temperature
- Integration of the Motronic, EOC, ETC and ASC functions with interaction between the various units:
  - o The electronic transmission control (ETC) of the 4HP22EH 4-speed automatic transmission interacts with the engine
  - o The automatic stability control (ASC) and engine drag control (EDC) available as optional extras also interact with the engine
  - o Top speed is controlled (limited) by interaction in the engine
- Self-diagnosis, error storage and emergency running programme

In developing this system of engine electronics, BMW's main objective was to obtain as many useful functions as possible, integrating them to provide one all-round electronic concept.

Particular features:

- Exact control of the fuel/air ratio through the use of hot-wire air mass meters not only able to determine the physically correct flow volume, but also offering the advantage of low flow resistance combined with small dimensions and low weight.

- The self-diagnosis system detects failures - even if they remain unnoticed by the driver - and stores them in the memory. This information is then retrieved by the service tester and the defects are repaired.

- The emergency programme intervenes as soon as the self-diagnosis system determines a specific failure (lack of data) and uses pre-determined stand-by data to ensure proper functioning of the engine.

Emission control

The floor pan of the new 7 Series was designed from the outset to accommodate an exhaust system with two separate catalytic converters for the 12-cylinder power unit. The large cross-section guarantees minimum flow resistance and a high degree of efficiency. Special insulation on the feed pipes and a new coating on the catalytic converters make sure that they quickly reach their starting temperature.

Noise control and vibrations

The following - in some cases highly sophisticated - measures have been taken to provide a high standard of motoring refinement and noise control:

- Torsionally rigid aluminium crankcase
- Small oscillating masses
- Stiff crankshaft with 12 counterweights
- Engine and transmission joined to form one rigid unit
- Intake system separated from the engine as such
- Oil sump and cylinder head covers in sandwich design (sheet metal/plastic)
- Quiet oil pump (tandem inner-wheel pump)
- Main and connecting rod bearings with small tolerances
- Entire space between the two cylinder banks soundproofed by a cover on top

Specifications

The specifications of the new 12-cylinder engine and the road performance of the BMW 750i catalyst underline the car's leading position in its class:

V-angle	60	o
Capacity	4988/304.3	cc/cu in
Bore	84/3.31	mm/in
Stroke	75/2.95	mm/in
Output (DIN)	220/330	kW/bhp
at	5200	rpm

Output-per-litre	44.1	kW/ltr
	60.1	bhp/ltr
Mean piston speed	13.0	metres/sec
at	5200	rpm
Max torque	450/332	Nm/ft-lb
at	4100	rpm
Torque-per-litre	90.2/66.5	Nm/ft-lb/ltr
Max energy per litre	1.13	kJ/ltr
Compression ratio	8.8:1	
Fuel grade	unleaded regular	91 ROM
Engine weight	240/529	kg/lb
Oil quantity	7.5	ltr
Top speed	250/155	km/h/mph
at	4810	rpm
Acceleration		
0-100 km/h (62mph)	7.4	sec
Standing-start km	27.3	sec

All specifications apply to the engine with and without catalytic converter.

Performance data with 4HP22EH automatic transmission in position S (the 750i catalyst is available exclusively with this transmission).

The top speed is limited to 250 km/h (155 mph) by electronic cut-off in the Motronic. This is not the absolute limit of performance in technical terms.

BMW AG

July 1987

Interim Report January - June 1987

In all, the first half of 1987 was satisfactory for BMW AG. The Company continued operating to its full capacity.
A good result may once again be expected for the entire year.

BMW AG in figures: January - June 1987

(Provisional figures for 1987)

			January - June 1987	January - June 1986	Change in %
Turnover		DM mill	8,920	7,610	+ 17.2
Production	Cars	units	235,277	232,200	+ 1.3
	Motorcycles	units	15,363	18,509	- 17.0
Sales	Cars	units	235,334	233,792	+ 0.7
	Motorcycles	units	15,380	18,476	- 16.8
Workforce on 30 June			52,641	48,071	+ 9.5

BMW AG

	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		316i CAT**	318i CAT**	320i CAT**	320i Convertible CAT**
Body Dimensions and weights	No of doors		2/4	2/4	2/4	2
	No of seats		5	5	5	4
	Length/width/height (unladen)	mm	4325/1645/1380	4325/1645/1380	4345/1645/1380	4325/1645/1370
	Wheelbase	mm	2570	2570	2570	2570
	Track, front	mm	1407	1407	1407	1407
	rear	mm	1415	1415	1415	1415
	Turning circle	m	10.5	10.5	10.5	10.5
	Fuel tank capacity/range[1]	l/km	55/640	55/650	64/650	62/open
	Unladen weight[2]	kg	1065 (1085)	1065 (1085)	1125 (1145)	1280 (1300)
	Max load	kg	460 (460)	460 (460)	460 (460)	400 (400)
	Max permissible weight[2]	kg	1525 (1545)	1525 (1545)	1585 (1605)	1680 (1700)
	Max trailer load[3]					
	– braked, max gradient 12%	kg	1200	1200	1200	1200
	– unbraked	kg	500	500	500	500
	Max roof load	kg	75	75	75	–[9]
	Max trailer nose weight	kg	50	50	50	50
	Luggage capacity, VDA test	l	425	425	425	312
Engine	Layout		Inline	Inline	Inline	Inline
	No of cylinders		4	4	6	6
	Mixture preparation		L-Jetronic	Motronic	Motronic	Motronic
	Displacement, effective	cc	1766	1795	1990	1990
	Bore/stroke	mm	89/71	84/81	80/66	80/66
	Compression ratio/fuel grade	:1	8.2/regular, unleaded	8.8/regular, unleaded	8.8/regular, unleaded	8.8/regular, unleaded
	Max output	kW/bhp	75/102	83/113	95/129	95/129
	– at engine speed	rpm	5800	5500	6000	6000
	Max torque	Nm	140	162	164	164
	– at engine speed	rpm	4500	4250	4300	4300
El.	Battery	Amp/h	44	46	50	50
	Alternator	Amp/W	80/1120	80/1120	80/1120	80/1120
Chassis/power transmission	Front suspension		Single-pivot spring struts with castor angle offset, small positive steering scrub radius, lateral force compensation, brake dive reduction			
	Rear suspension		Independent, with semi-trailing arms (15° trail angle), separate springs and shock absorbers, squat compensation			
	Brakes, front		Single-piston floating caliper disc brakes		Single-piston floating calipers with vented discs	
	rear		Drums			Single-piston floating calipers
	Steering		Rack and pinion, ratio 21.4:1	Rack and pinion, ratio 21.4:1	Rack and pinion, ratio 21.4:1	Rack and pinion, ratio 21.4:1 power assistance dependent on engine speed
	Final drive ratio		4.10 (3.91)	4.10 (4.10)	4.10 (4.10)	4.27 (4.27)
	Gear ratios I	:1	3.72 (2.73)	3.72 (2.48)	3.72 (2.48)	3.72 (2.48)
	II	:1	2.02 (1.56)	2.02 (1.48)	2.02 (1.48)	2.02 (1.48)
	III	:1	1.32 (1.0)	1.32 (1.00)	1.32 (1.0)	1.32 (1.0)
	IV	:1	1.00 (0.73)	1.00 (0.73)	1.00 (0.73)	1.00 (0.73)
	V	:1	0.80 (–)	0.80 (–)	0.80 (–)	0.80 (–)
	Reverse	:1	3.45 (2.09)	3.45 (2.09)	3.45 (2.09)	3.45 (2.09)
	Tyres		175/70 R 14 T	195/65 R 14 H	195/65 R 14 H	195/65 R 14 H
	Wheels		5½ J x 14/steel	5½ J x 14/steel	5½ J x 14/steel	5½ J x 15/steel
Performance	Power-weight ratio	kg/kW	14.2 (14.5)	12.8 (13.1)	11.8 (12.1)	13.5 (13.7)
	Torque-weight ratio	kg/Nm	7.6 (7.8)	6.6 (6.7)	6.9 (7.0)	7.8 (7.9)
	Output per litre	kW	42.5	46.2	47.7	47.7
	Torque per litre	Nm	79.3	90.3	82.4	82.4
	Acceleration, 0–100 km/h	s	12.1 (14.1)	10.8 (12.1)	10.6 (12.7)	11.5 (13.4)
	0–1000 m	s	33.7 (35.6)	32.2 (33.9)	31.7 (34.0)	32.5 (34.5)
	80–120 km/h in direct gear	s	13.2	10.9	11.6	11.9
	Top speed	km/h	182 (175)	188 (184)	197 (188)	195 (188)
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h	l/100 km	6.6/–	6.7/–	7.5/–	not final
	– at steady 120 km/h		8.5/–	8.6/–	9.5/–	
	– urban cycle		10.7/–	10.3/–	12.8/–	
	– average		8.6/–	8.5/–	9.9/–	
	4-speed automatic transmission without/with EH control					
	– at steady 90 km/h	l/100 km	7.0/–	6.7/–	7.5/7.5	
	– at steady 120 km/h		9.0/–	8.6/–	9.5/9.5	
	– urban cycle		10.7/–	10.4/–	12.8/12.9	
	– average		8.9/–	8.6/–	9.9/10.0	

( ) Figures in brackets: with automatic transmission
1) With standard gearbox, related to average ECE test consumption
2) Unladen weight and max weight 20 kg higher on 4-door cars
3) An increase is possible if certain conditions are satisfied
5) 3.91:1 with sports gearbox option
6) Battery in luggage compartment
8) Prepared for catalytic converter installation; data as for ECE version
9) With hardtop, probable roof load 30 kg
* Also with preparation for catalytic converter installation as an option

Date of issue: 9/87

	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		325 i CAT*	325 i Convertible CAT*	325 iX CAT*	M 3 CAT*
Body Dimensions and weights	No of doors		2/4	2	2/4	2
	No of seats		5	4	5	4
	Length/width/height (unladen)	mm	4325/1645/1380	4325/1645/1370	4345/1662/1400	4345/1680/1370
	Wheelbase	mm	2570	2570	2570	2562
	Track, front	mm	1407	1407	1420	1412
	rear	mm	1415	1415	1416	1424
	Turning circle	m	10.5	10.5	11.1	11.1
	Fuel tank capacity/range [1]	l/km	64/660	62/640	64 (not final)	70/795
	Unladen weight [2]	kg	1180 (1200)	1310 (1330)	1280 (1300)	1200 (–)
	Max load	kg	460 (460)	400 (400)	460 (460)	400 (–)
	Max permissible weight [2]	kg	1640 (1660)	1710 (1730)	1740 (1760)	1600 (–)
	Max trailer load [3]	kg				
	– braked, max gradient 12%	kg	1200	1200	1200 [3]	–
	– unbraked	kg	500	500	500	–
	Max roof load	kg	75	–[8]	75	75
	Max trailer nose weight	kg	50	50	50	–
	Luggage capacity, VDA test	l	404	312	404 [6]	420
Engine	Layout		Inline	Inline	Inline	Inline
	No of cylinders		6	6	6	4
	Mixture preparation		Motronic	Motronic	Motronic	Motronic 4 valves/cyl.
	Displacement, effective	cc	2494	2494	2494	2302
	Bore/stroke	mm	84/75	84/75	84/75	93.4/84
	Compression ratio/fuel grade	:l	8.8/regular, unleaded	8.8/regular, unleaded	8.8/regular, unleaded	10.5/regular, unleaded
	Max output	kW/bhp	125/170	125/170	125/170	143/195
	– at engine speed	rpm	5800	5800	5800	6750
	Max torque	Nm	222	222	222	230
	– at engine speed	rpm	4300	4300	4300	4750
El.	Battery	Amp/h	66 [6]	50	66 [6]	66 [6]
	Alternator	Amp/W	80/1120	80/1120	80/1120	90/1260
Chassis/power transmission	Front suspension		Single-pivot spring struts with castor angle offset, small positive steering scrub radius, lateral force compensation, brake dive reduction; BMW M 3 with increased castor; BMW 325 iX Cat with negative steering scrub radius			
	Rear suspension		Independent, with semi-trailing arms (15° trail angle), separate springs and shock absorbers, squat compensation			
	Brakes, front		Single-piston floating caliper disc brakes with vented discs; antilock braking system (ABS)			
	rear		Single-piston floating caliper disc brakes with integral handbrake drums; antilock braking system (ABS)			
	Steering		Rack and pinion, ratio 21.4:1	Rack and pinion, ratio 21.4:1 power assistance dependent on engine speed	Rack and pinion, ratio 20.4:1 power assistance dependent on engine speed	Rack and pinion, ratio 19.6:1
	Final drive ratio		3.73 [5] (3.73)	3.73 [5] (3.73)	3.91 (3.91)	–/3.25 (–)
	Gear ratios I	:1	3.83 (2.48)	3.83 (2.48)	3.83 (2.48)	–/3.72 (–)
	II	:1	2.20 (1.48)	2.20 (1.48)	2.20 (1.48)	–/2.40 (–)
	III	:1	1.40 (1.00)	1.40 (1.0)	1.40 (1.0)	–/1.77 (–)
	IV	:1	1.00 (0.73)	1.00 (0.73)	1.00 (0.73)	–/1.26 (–)
	V	:1	0.81 (–)	0.81 (–)	0.81 (–)	–/1.00 (–)
	Reverse	:1	3.46 (2.09)	3.46 (2.09)	3.46 (2.09)	–/4.23 (–)
	Tyres		195/65 VR 14	195/65 VR 14	195/65 VR 14	205/55 VR 15
	Wheels		5½ J x 14/steel	6 J x 14/alloy	6 J x 14/steel	7 J x 15/alloy
Performance	Power-weight ratio	kg/kW	9.4 (9.6)	10.5 (10.6)	10.2 (10.4)	8.4 (–)
	Torque-weight ratio	kg/Nm	5.3 (5.4)	5.9 (6.0)	5.8 (5.9)	5.2 (–)
	Output per litre	kW	50.1	50.1	50.1	62.1
	Torque per litre	Nm	89.0	89.0	89.0	99.9
	Acceleration, 0–100 km/h	s	8.3 (9.9)	8.7 (10.5)	9.2 (11.2)	6.9 (–)
	0–1000 m	s	29.0 (30.8)	29.5 (31.5)	30.1 (32.4)	27.6 (–)
	80–120 km/h in direct gear	s	9.1/8.4	9.8	10.0	–/7.5 (–)
	Top speed	km/h	218 (212)	216 (210)	212 (206)	230 (–)
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h	l/100 km	7.2/7.3	7.2/7.6		–/6.2
	– at steady 120 km/h		9.0/9.1	8.9/9.4		–/7.8
	– urban cycle		12.9/13.1	12.9/13.1		–/12.4
	– average		9.7/9.8	9.7/10.0		–/8.8
	4-speed automatic transmission without/with EH control				not final	
	– at steady 90 km/h	l/100 km	7.3/7.3	7.3/7.3		–/–
	– at steady 120 km/h		9.2/9.2	9.1/9.1		–/–
	– urban cycle		13.3/13.1	13.4/13.2		–/–
	– average		9.9/9.9	9.9/9.9		–/–

( ) Figures in brackets: with automatic transmission
1) With standard gearbox, related to average ECE test consumption
2) Unladen weight and max weight 20 kg higher on 4-door cars
3) An increase is possible if certain conditions are satisfied
5) 3.91:1 with sports gearbox option
6) Battery in luggage compartment
8) With hardtop, probable roof load 30 kg

* Also with preparation for catalytic converter installation as an option

Date of issue: 9/87

	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		324 d	324 td		
Body Dimensions and weights	No of doors		4	4		
	No of seats		5	5		
	Length/width/height (unladen)	mm	4325/1645/1380	4325/1645/1380		
	Wheelbase	mm	2570	2570		
	Track, front	mm	1407	1407		
	rear	mm	1415	1415		
	Turning circle	m	10.5	10.5		
	Fuel tank capacity/range [1]	l/km	55/795	55/785		
	Unladen weight [2]	kg	1195 (1215)	1260 (1280)		
	Max load	kg	460 (460)	460 (460)		
	Max permissible weight [2]	kg	1655 (1675)	1720 (1740)		
	Max trailer load [3]	kg				
	– braked, max gradient 12%	kg	1200	1200		
	– unbraked	kg	500	500		
	Max roof load	kg	75	75		
	Max trailer nose weight	kg	50	50		
	Luggage capacity, VDA test	l	404	404		
Engine	Layout		Inline	Inline		
	No of cylinders		6	6		
	Mixture preparation		Fuel injection into pre-combustion chambers	Digital Diesel Electronics		
	Displacement, effective	cc	2443	2443		
	Bore/stroke	mm	80/81	80/81		
	Compression ratio/fuel grade	:l	22.0/diesel	22.0/diesel		
	Max output	kW/bhp	63/86	85/115		
	– at engine speed	rpm	4600	4800		
	Max torque	Nm	152	220		
	– at engine speed	rpm	2500	2400		
El.	Battery	Amp/h	90 [4]	90 [4]		
	Alternator	Amp/W	80/1120	80/1120		
Chassis/power transmission	Front suspension		Single-pivot spring struts with castor angle offset, small positive steering scrub radius, lateral force compensation, brake dive reduction			
	Rear suspension		Independent, with semi-trailing arms (15° trail angle), separate springs and shock absorbers, squat compensation			
	Brakes, front		Single-piston floating caliper disc brakes with vented discs			
	rear		Drums	Single-piston floating caliper disc brakes with integral handbrake drums		
	Steering		Rack and pinion, ratio 21.4:1	Rack and pinion, ratio 20.5:1 power assistance dependent on engine speed		
	Final drive ratio		3.45 (3.45)	3.25 (3.25)		
	Gear ratios I	:l	3.72 (2.73)	3.83 (2.73)		
	II	:l	2.02 (1.56)	2.20 (1.56)		
	III	:l	1.32 (1.0)	1.40 (1.0)		
	IV	:l	1.00 (0.73)	1.00 (0.73)		
	V	:l	0.80 (–)	0.81 (–)		
	Reverse	:l	3.45 (2.09)	3.46 (2.09)		
	Tyres		175/70 R 14 T	195/65 R 14 H		
	Wheels		5½ J x 14/steel	5½ J x 14/steel		
Performance	Power-weight ratio	kg/kW	19.0 (19.3)	14.8 (15.1)		
	Torque-weight ratio	kg/Nm	7.9 (8.0)	5.7 (5.8)		
	Output per litre	kW/l	25.8	34.8		
	Torque per litre	Nm/l	62.2	90.1		
	Acceleration, 0–100 km/h	s	16.1 (18.5)	11.9 (12.8)		
	0–1000 m	s	37.0 (38.6)	33.4 (34.4)		
	80–120 km/h in direct gear	s	15.7/–	11.1/–		
	Top speed	km/h	165 (158)	187 (182)		
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h	l/100 km	5.0/–	5.2/–		
	– at steady 120 km/h		6.9/–	6.9/–		
	– urban cycle		8.7/–	8.9/–		
	– average		6.9/–	7.0/–		
	4-speed automatic transmission without/with EH control					
	– at steady 90 km/h	l/100 km	5.3/–	5.2/–		
	– at steady 120 km/h		7.1/–	6.9/–		
	– urban cycle		9.6/–	8.9/–		
	– average		7.3/–	7.0/–		

( ) Figures in brackets: with automatic transmission
1) With standard gearbox, related to average ECE test consumption
2) Unladen weight and max weight 20 kg higher on 4-door cars
3) An increase is possible if certain conditions are satisfied
4) Battery in luggage compartment
5) 3.91:1 with sports gearbox option

Date of issue: 9/87

	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		TOURING			
			320 i CAT*	325 i CAT*	325 iX CAT*	324 td
Body Dimensions and weights	No of doors		5	5	5	5
	No of seats		5	5	5	5
	Length/width/height (unladen)	mm	4325/1645/1380	4325/1645/1380	4325/1662/1380	4325/1645/1380
	Wheelbase	mm	2570	2570	2570	2570
	Track, front	mm	1407	1407	1420	1407
	rear	mm	1415	1415	1416	1415
	Turning circle	m	10.5	10.5	11.1	10.5
	Fuel tank capacity/range [1]	l/km	64/not final	64/not final	64/not final	55/not final
	Unladen weight [2]	kg	1230 (1250)	1270 (1290)	1360 (1380) [8]	1300 (1320)
	Max load	kg	480 (480)	480 (480)	480 (480) [8]	480 (480)
	Max permissible weight [2]	kg	1710 (1730)	1750 (1770)	1850 (1870) [8]	1780 (1800)
	Max trailer load [3]					
	– braked, max gradient 12%	kg	1200	1200	1200 [8]	1200
	– unbraked	kg	500	500	500 [8]	500
	Max roof load	kg	75	75	75	75
	Max trailer nose weight	kg	50	50	50	50
	Luggage capacity, VDA test	l	370–1125	370–1125	370–1125	370–1125
Engine	Layout		Inline	Inline	Inline	Inline
	No of cylinders		6	6	6	6
	Mixture preparation		Motronic	Motronic	Motronic	Digital Diesel Electronics
	Displacement, effective	cc	1990	2494	2494	2443
	Bore/stroke	mm	80/66	84/75	84/75	80/81
	Compression ratio/fuel grade	:1	8.8/regular, unleaded	8.8/regular, unleaded	8.8/regular, unleaded	22.0/diesel
	Max output	kW/bhp	95/129	125/170	125/170	85/115
	– at engine speed	rpm	6000	5800	5800	4800
	Max torque	Nm	164	222	222	220
	– at engine speed	rpm	4300	4300	4300	2400
El.	Battery	Amp/h	55	63	84 [6]	84 [6]
	Alternator	Amp/W	80/1120	80/1120	80/1120	80/1120
Chassis/power transmission	Front suspension		Single-pivot spring struts with castor angle offset, small positive steering scrub radius, lateral force compensation, brake dive reduction;			
	Rear suspension		Independent, with semi-trailing arms (15° trail angle), separate springs and shock absorbers, squat compensation			
	Brakes, front		Single-piston floating caliper disc brakes with vented discs; BMW 325 i/325 iX with antilock braking system (ABS)			
	rear		Single-piston floating caliper disc brakes with integral handbrake drums; BMW 325 i/325 iX with antilock braking system (ABS); BMW 325 iX with vented discs			
	Steering		Rack and pinion, ratio 21.4:1	Rack and pinion, ratio 21.4:1	Rack and pinion, ratio 20.4:1 power assistance dependent on engine speed	Rack and pinion, ratio 20.5:1 power assistance dependent on engine speed
	Final drive ratio		4.25 (4.27)	3.91 (3.91)	3.91 (4.10)	3.25 (3.25)
	Gear ratios I	:1	3.72 (2.48)	3.83 (2.48)	3.83 (2.48)	3.83 (2.73)
	II	:1	2.02 (1.48)	2.20 (1.48)	2.20 (1.48)	2.20 (1.56)
	III	:1	1.32 (1.0)	1.40 (1.0)	1.40 (1.0)	1.40 (1.0)
	IV	:1	1.00 (0.73)	1.00 (0.73)	1.00 (0.73)	1.00 (0.73)
	V	:1	0.80 (–)	0.81 (–)	0.81 (–)	0.81 (–)
	Reverse	:1	3.45 (2.09)	3.46 (2.09)	3.46 (2.09)	3.46 (2.09)
	Tyres		195/65 R 14 H	195/65 VR 14	TD 200/60 VR 365	195/65 R 14 H
	Wheels		6 J x 14/alloy	6 J x 14/alloy	365 x 150 TD/alloy	6 J x 14/alloy
Performance	Power-weight ratio	kg/kW	12.9 (13.2)	10.2 (10.3)	11.0 (11.0)	15.3 (15.5)
	Torque-weight ratio	kg/Nm	7.5 (7.6)	5.7 (5.8)	6.2 (6.2)	5.9 (6.0)
	Output per litre	kW	47.7	50.1	50.1	34.8
	Torque per litre	Nm	82.4	89.0	89.0	90.1
	Acceleration, 0–100 km/h	s	11.5 (13.3)	8.8 (10.1)	9.7 (11.2)	12.3 (13.3)
	0–1000 m	s	32.5 (34.5)	29.6 (31.3)	30.7 (32.6)	33.7 (34.8)
	80–120 km/h in direct gear	s	11.7	9.2	10.8	11.5
	Top speed	km/h	196 (188)	214 (212)	208 (206)	187 (182)
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h	l/100 km				
	– at steady 120 km/h					
	– urban cycle					
	– average					
	4-speed automatic transmission without/with EH control		not final	not final	not final	not final
	– at steady 90 km/h	l/100 km				
	– at steady 120 km/h					
	– urban cycle					
	– average					

( ) Figures in brackets: with automatic transmission
1) With standard gearbox, related to average ECE test consumption
2) Unladen weight and max weight 20 kg higher on 4-door cars
3) An increase is possible if certain conditions are satisfied
6) Battery in luggage compartment
8) Provisional values

* Also with preparation for catalytic converter installation as an option

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	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		520 i Cat.*	525 e Cat.*	535 i Cat.*	M 535 i Cat.*
Body Dimensions and weights	No of doors		4	4	4	4
	No of seats		5	5	5	5
	Length/width/height (unladen)	mm	4620/1700/1415	4620/1700/1415	4620/1710/1397	4604/1710/1397
	Wheelbase	mm	2625	2625	2628	2628
	Track, front	mm	1430	1430	1430	1430
	rear	mm	1460	1460	1460	1460
	Turning circle	m	10.5	10.5	11.05	11.05
	Fuel tank capacity/range[1]	l/km	70/700	70/745	70/620	70/625
	Unladen weight[2]	kg	1270 (1290)	1280 (1300)	1370 (1390)	1390 (1410)
	Max load	kg	510 (510)	510 (510)	510 (510)	510 (510)
	Max permissible weight	kg	1780 (1800)	1790 (1810)	1880 (1900)	1900 (1920)
	Max trailer load[2]					
	– braked, max gradient 12%	kg	1400	1400 (1500)	1500	1500
	– unbraked	kg	500	500	500	500
	Max roof load	kg	75	75	75	75
	Max trailer nose weight	kg	50	50	50	50
	Luggage capacity, VDA test	l	460	460	460	460
Engine	Layout		Inline	Inline	Inline	Inline
	No of cylinders		6	6	6	6
	Mixture preparation		Motronic	Motronic	Motronic	Motronic
	Displacement, effective	cm^3	1990	2693	3430	3430
	Bore/stroke	mm	80/66	84/81	92/86	92/86
	Compression ratio/fuel grade	:1	8.8/regular, unleaded	8.5/regular, unleaded	8.0/regular, unleaded	8.0/regular, unleaded
	Max output	kW/bhp	95/129	95/129	136/185	136/185
	– at engine speed	min^{-1}	6000	4800	5400	5400
	Max torque	Nm	164	230	290	290
	– at engine speed	min^{-1}	4300	3200	4000	4000
El.	Battery	Amp/h	55	66	66	66
	Alternator	Amp/W	80/1120	80/1120	80/1120	80/1120
Chassis/power transmission	Front suspension		Double-pivot spring struts with castor angle offset, small positive steering scrub radius, lateral force compensation, brake dive reduction			
	Rear suspension		Independent, with semi-trailing arms (13° trail angle), additional wheel locating link			
	Brakes, front		Single-piston floating calipers with vented discs			
	rear		Single-piston floating calipers with integrated handbrake drums			
	Steering		Ball and nut, with hydraulic power assistance dependent on engine speed			
			16.2:1	16.2:1	15.1:1	15.1:1
	Final drive ratio		4.27 (4.27)	3.25 (3.46)	3.25 (3.45)	3.25 (3.45)
	Gear ratios I	:1	3.72 (2.73)	3.83 (2.48)	3.83 (2.48)	3.83 (2.48)
	II	:1	2.02 (1.56)	2.20 (1.48)	2.20 (1.48)	2.20 (1.48)
	III	:1	1.32 (1.00)	1.40 (1.00)	1.40 (1.00)	1.40 (1.00)
	IV	:1	1.00 (0.73)	1.00 (0.73)	1.00 (0.73)	1.00 (0.73)
	V	:1	0.80 (–)	0.81 (–)	0.81 (–)	0.81 (–)
	Reverse	:1	3.45 (2.09)	3.46 (2.09)	3.46 (2.09)	3.46 (2.09)
	Tyres		195/70 R 14 H	195/70 R 14 H	220/55 VR 390	220/55 VR 390
	Wheels		6 J x 14/steel	6 J x 14/steel	165 TR 390/ light-alloy	165 TR 390/ light-alloy
Performance	Power-weight ratio	kg/kW	13.4 (13.6)	13.5 (13.7)	10.1 (10.2)	10.2 (10.4)
	Torque-weight ratio	kg/Nm	7.7 (7.9)	5.6 (5.7)	4.7 (4.8)	4.8 (4.9)
	Output per litre	kW	47.7	35.3	39.7	39.7
	Torque per litre	Nm	82.4	85.4	84.5	84.5
	Acceleration, 0–100 km/h	s	12.1 (14.4)	10.8 (12.4)	7.9 (9.6)	7.9 (9.6)
	0–1000 m	s	33.1 (35.6)	32.2 (33.9)	29.0 (30.4)	29.0 (30.4)
	80–120 km/h in direct gear	s	13.7	11.6	9.9	9.9
	Top speed	km/h	190 (184)	190 (184)	212 (207)	217 (211)
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h	l/100 km	7.6/–	7.0/–	8.0/–	8.0/–
	– at steady 120 km/h		9.4/–	8.9/–	10.3/–	10.0/–
	– urban cycle		12.9/–	12.2/–	15.8/–	15.8/–
	– average		10.0/–	9.4/–	11.4/–	11.3/–
	4-speed automatic transmission without/with EH control					
	– at steady 90 km/h	l/100 km	7.6/7.6	6.9/6.9	–/8.4	–/8.2
	– at steady 120 km/h		9.3/9.3	9.0/9.0	–/10.6	–/10.4
	– urban cycle		12.9/12.9	12.3/12.1	–/17.0	–/17.0
	– average		9.9/9.9	9.4/9.3	–/12.0	–/11.9

( ) Figures in brackets: with automatic transmission
1) With standard gearbox, related to average ECE test consumption
2) An increase is possible if certain conditions are satisfied
* Also with preparation for catalytic converter installation as an option

Date of issue: 9/87

	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		635 CSi CAT*	M 635 CSi CAT*		
Body Dimensions and weights	No of doors		2	2		
	No of seats		4	4		
	Length/width/height (unladen)	mm	4815/1725/1365	4815/1725/1353		
	Wheelbase	mm	2625	2625		
	Track, front	mm	1430	1430		
	rear	mm	1460	1464		
	Turning circle	m	11.7	11.7		
	Fuel tank capacity/range[1]	l/km	70/580	70/590		
	Unladen weight	kg	1475 (1495)	1515 (–)		
	Max load	kg	420 (420)	380 (–)		
	Max permissible weight	kg	1895 (1915)	1895 (–)		
	Max trailer load[2]					
	– braked, max gradient 12%	kg	1600	–		
	– unbraked	kg	650	–		
	Max roof load	kg	75	75		
	Max trailer nose weight	kg	50	–		
	Luggage capacity, VDA test	l	413	335		
Engine	Layout		Inline	Inline		
	No of cylinders		6	6		
	Mixture preparation		Motronic	Motronic 4 valves per cyl.		
	Displacement, effective	cc	3430	3453		
	Bore/stroke	mm	92/86	93,4/84		
	Compression ratio/fuel grade	:1	9.0/regular, unleaded	9.8/premium, unleaded		
	Max output	kW/bhp	155/211	191/260		
	– at engine speed	rpm	5700	6500		
	Max torque	Nm	305	330		
	– at engine speed	rpm	4000	4500		
El.	Battery	Amp/hh	66	90[3]		
	Alternator	Amp/W	90/1260	90/1260		
Chassis/power transmission	Front suspension		Double-pivot spring struts with castor angle offset, small positive steering scrub radius, lateral force compensation, brake dive reduction			
	Rear suspension		Independent, with semi-trailing arms (13° trail angle), additional wheel locating link			
				Sports suspension settings, single-tube gas-filled shock absorbers		
	Brakes, front		Single-piston fixed calipers with ventilated discs; antilock braking system (ABS)	Four-piston fixed calipers with vented discs, antilock braking system (ABS)		
	rear		Single-piston floating calipers with integrated handbrake drums; antilock braking system (ABS)			
	Steering		Ball and nut, with hydraulic power assistance dependent on engine speed			
			15.1:1	15.1:1		
	Final drive ratio		3.64 (3.64)	3.91 (–)		
	Gear ratios I	:1	3.83 (2.48)	3.51 (–)		
	II	:1	2.20 (1.48)	2.08 (–)		
	III	:1	1.40 (1.00)	1.35 (–)		
	IV	:1	1.00 (0.73)	1.00 (–)		
	V	:1	0.81 (–)	0.81 (–)		
	Reverse	:1	3.46 (2.09)	3.71 (–)		
	Tyres		205/70 VR 14	220/55 VR 390		
	Wheels		6½ J x 14/ light-alloy	165 TR 390/ light-alloy		
Performance	Power-weight ratio	kg/kW	9.5 (9.6)	7.9 (–)		
	Torque-weight ratio	kg/Nm	4.8 (4.9)	4.6 (–)		
	Output per litre	kW	45.2	55.3		
	Torque per litre	Nm	88.9	95.6		
	Acceleration, 0–100 km/h	s	8.1 (9.0)	6.9 (–)		
	0–1000 m	s	28.7 (29.7)	26.8 (–)		
	80–120 km/h in direct gear	s	8.9	–/7.3 (–)		
	Top speed	km/h	225 (220)	245 (–)		
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h	l/100 km	8.2/–	–/8.1		
	– at steady 120 km/h		10.3/–	–/10.1		
	– urban cycle		17.4/–	–/17.6		
	– average		12.0/–	–/11.9		
	4-speed automatic transmission without/with EH control					
	– at steady 90 km/h	l/100 km	–/8.0	–/–		
	– at steady 120 km/h		–/10.2	–/–		
	– urban cycle		–/17.5	–/–		
	– average		–/11.9	–/–		

( ) Figures in brackets: with automatic transmission
1) With standard gearbox, related to average ECE test consumption
2) An increase is possible if certain conditions are satisfied
4) Battery in luggage compartment
* Also with preparation for catalytic converter installation as an option

Date of issue: 9/87

	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		730 i CAT*	735 i CAT*	735 iL CAT*	
Body Dimensions and weights	No of doors No of seats		4 5	4 5	4 5	
	Length/width/height (unladen) Wheelbase Track, front rear Turning circle Fuel tank capacity/range[1]	mm mm mm mm m l/km	4910/1845/1411 2832 1527 1550 11.6 90/810	4910/1845/1411 2832 1527 1550 11.6 90/790	5024/1845/1400 2947 1528 1556 12.0 102/880	
	Unladen weight Max load Max permissible weight Max trailer load[2] – braked, max gradient 12% – unbraked Max roof load Max trailer nose weight[2] Luggage capacity, VDA test	kg kg kg kg kg kg kg	1600 (1600) 520 (520) 2130 (2150) 1600 650 100 50 500	1600 (1630) 520 (520) 2150 (2170) 1600 650 100 50 500	1600 (1680) 520 (520) 2180 (2200) 1600 650 100 50 500	
Engine	Layout No of cylinders Mixture preparation		Inline 6 Motronic	Inline 6 Motronic	Inline 6 Motronic	
	Displacement, effective Bore/stroke Compression ratio/fuel grade Max output – at engine speed Max torque – at engine speed	cc mm :1 kW/bhp rpm Nm rpm	2986 89/80 9,0/regular, unleaded 138/188 5800 260 4000	3430 92/86 9,0/regular, unleaded 155/211 5700 305 4000	3430 92/86 9,0/regular, unleaded 155/211 5700 305 4000	
El.	Battery Alternator	Amp/h Amp/W	84 90/1260	84 90/1260	84 90/1260	
Chassis/power transmission	Front suspension		Double-pivot spring struts with castor angle offset, small positive steering scrub radius, lateral force compensation, brake dive reduction			
	Rear suspension		Independent, with precision semi-trailing arms (13° trail angle), additional wheel locating link; with squat reduction and anti-dive compensation			
	Brakes, front		Single-piston floating calipers with ventilated discs; antilock braking system (ABS)			
	rear		Single-piston floating calipers with integrated handbrake drums; antilock braking system (ABS)			
	Steering		Ball and nut, with hydraulic power assistance dependent on engine speed; ratio 14.5:1			
	Final drive ratio Gear ratios I II III IV V Reverse	 :1 :1 :1 :1 :1 :1	3.64 (3.64) 3.83 (2.48) 2.20 (1.48) 1.40 (1.0) 1.00 (0.73) 0.81 (–) 3.46 (2.09)	3.45 (3.45) 3.83 (2.48) 2.20 (1.48) 1.40 (1.0) 1.00 (0.73) 0.81 (–) 3.46 (2.09)	3.45 (3.45) 3.83 (2.48) 2.20 (1.48) 1.40 (1.0) 1.00 (0.73) 0.81 (–) 3.46 (2.09)	
	Tyres Wheels		205/65 VR 15 6½ J x 15/steel	225/60 VR 15 7 J x 15/ light-alloy	225/60 VR 15 7 J x 15/ light-alloy	
Performance	Power-weight ratio Torque-weight ratio Output per litre Torque per litre	kg/kW kg/Nm kW Nm	11.6 (11.6) 6.2 (6.2) 46.2 87.1	10.3 (10.4) 5.3 (5.3) 45.2 88.9	10.7 (10.8) 5.4 (5.5) 45.2 88.9	
	Acceleration, 0–100 km/h 0–1000 m 80–120 km/h in direct gear Top speed	s s s km/h	9.4 (11.3) 30.2 (32.3) 10.9 220 (212)	8.3 (9.8) 28.9 (30.5) 10.2 230 (222)	8.3 (9.8) 28.9 (30.5) 10.2 230 (222)	
Fuel consumption	5-speed/5-speed sports gearbox – at steady 90 km/h – at steady 120 km/h – urban cycle – average 4-speed automatic transmission without/with EH control – at steady 90 km/h – at steady 120 km/h – urban cycle – average	 l/100 km l/100 km 	 7.6/– 9.4/– 16.3/– 11.1/– 7.4/7.4 9.3/9.3 16.9/16.9 11.2/11.2	 7.7/– 9.7/– 16.8/– 11.4/– /–7.6 /–9.6 /–17.6 /–11.6	 7.7/– 9.6/– 17.6/– 11.6/– –/7.6 –/9.5 –/16.7 –/11.3	

( ) Figures in brackets: with automatic transmission
1) With standard gearbox, related to average ECE test consumption
2) An increase is possible if certain conditions are satisfied
* Also with preparation for catalytic converter installation as an option

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	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		750 i CAT*	750 iL CAT*		
Body Dimensions and weights	No of doors		4	4		
	No of seats		5	5		
	Length/width/height (unladen)	mm	4910/1845/1400	5024/1845/1400		
	Wheelbase	mm	2833	2947		
	Track, front	mm	1528	1528		
	rear	mm	1556	1556		
	Turning circle	m	11.6	12.0		
	Fuel tank capacity/range	l/km	102/770	102/755		
	Unladen weight	kg	(1800)	(1860)		
	Max load	kg	(520)	(520) [3]		
	Max permissible weight	kg	(2320)	(2380)		
	Max trailer load [1]					
	– braked, max gradient 12%	kg	1600	1600		
	– unbraked	kg	650	650		
	Max roof load	kg	100	100		
	Max trailer nose weight [1]	kg	50	50		
	Luggage capacity, VDA test		500	500		
Engine	Layout		V	V		
	No of cylinders		12	12		
	Mixture preparation		Motronic	Motronic		
	Displacement, effective	cc	4988	4988		
	Bore/stroke	mm	84/75	84/75		
	Compression ratio/fuel grade	:1	8.8/regular, unleaded	8.8/regular, unleaded		
	Max output	kW/bhp	220/300	220/300		
	– at engine speed	rpm	5200	5200		
	Max torque	Nm	450	450		
	– at engine speed	rpm	4100	4100		
El.	Battery	Amp/h	85	85		
	Alternator	Amp/W	115/1610	115/1610		
Chassis/power transmission	Front suspension		Double-pivot spring struts with castor angle offset, positive steering scrub radius, lateral force compensation, brake dive reduction			
	Rear suspension		Independent, with precision semi-trailing arms (13° trail angle), additional wheel locating link; with squat reduction and anti-dive compensation			
	Brakes, front		Single-piston floating calipers with ventilated discs; antilock braking system (ABS)			
	rear		Single-piston floating calipers with ventilated discs and integrated handbrake drums; antilock braking system (ABS)			
	Steering		Ball and nut, with hydraulic power assistance dependent on road speed; (Servotronic); ratio 14.5:1			
	Final drive ratio		(3.15)	(3.15)		
	Gear ratios I	:1	(2.48)	(2.48)		
	II	:1	(1.48)	(1.48)		
	III	:1	(1.0)	(1.0)		
	IV	:1	(0.73)	(0.73)		
	V	:1	–	–		
	Reverse	:1	(2.09)	(2.09)		
	Tyres		225/60 VR 15	225/60 VR 15		
	Wheels		7 J x 15/light-alloy	7 J x 15/light-alloy		
Performance	Power-weight ratio	kg/kW	8.2	8.5		
	Torque-weight ratio	kg/Nm	4.0	4.1		
	Output per litre	kW	44.1	44.1		
	Torque per litre	Nm	90.2	90.2		
	Acceleration, 0–100 km/h	s	(7.4)	(7.4)		
	0–1000 m	s	(27.3)	(27.3)		
	80–120 km/h in direct gear	s	–	–		
	Top speed	km/h	(250) [2]	(250) [2]		
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h					
	– at steady 120 km/h					
	– urban cycle					
	– average					
	4-speed automatic transmission without/with EH control					
	– at steady 90 km/h	l/100 km	–/8.8	–/8.8		
	– at steady 120 km/h		–/10.9	–/10.9		
	– urban cycle		–/19.8	–/20.8		
	– average		–/13.2	–/13.5		

( ) Figures in brackets: with automatic transmission
1) An increase is possible if certain conditions are satisfied
2) Governed
3) With trailer tow hitch option, load limit 495 kg
* Also with preparation for catalytic converter installation as an option

Date of issue: 9/87

	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		316**	318i**	320i**	320i Convertible**
Body	No of doors		2/4	2/4	2/4	2
	No of seats		5	5	5	4
Dimensions and weights	Length/width/height (unladen)	mm	4325/1645/1380	4325/1645/1380	4345/1645/1380	4325/1645/1370
	Wheelbase	mm	2570	2570	2570	2570
	Track, front	mm	1407	1407	1407	1407
	rear	mm	1415	1415	1415	1415
	Turning circle	m	10.5	10.5	10.5	10.5
	Fuel tank capacity/range[1]	l/km	55/705	55/695	64/695	62/655
	Unladen weight[2]	kg	1050 (1070)	1065 (1085)	1125 (1145)	1280 (1300)
	Max load	kg	460 (460)	460 (460)	460 (460)	400 (400)
	Max permissible weight[2]	kg	1510 (1530)	1525 (1545)	1585 (1605)	1680 (1700)
	Max trailer load[3]					
	– braked, max gradient 12%	kg	1200	1200	1200	1200
	– unbraked	kg	500	500	500	500
	Max roof load	kg	75	75	75	–[5]
	Max trailer nose weight	kg	50	50	50	50
	Luggage capacity, VDA test	l	425	425	425	312
Engine	Layout		Inline	Inline	Inline	Inline
	No of cylinders		4	4	6	6
	Mixture preparation		2 BE carburettor	Motronic	Motronic	Motronic
	Displacement, effective	cc	1766	1795	1990	1990
	Bore/stroke	mm	89/71	84/81	80/66	80/66
	Compression ratio/fuel grade	:1	9.5/premium	8.8/regular, unleaded	9.4/premium, unleaded	9.4/premium, unleaded
	Max output	kW/bhp	66/90	85/115	95/129	95/129
	– at engine speed	rpm	5500	5500	6000	6000
	Max torque	Nm	140	165	174	174
	– at engine speed	rpm	4000	4250	4000	4000
El.	Battery	Ah	44	46	50	50
	Alternator	A/W	80/910	80/1120	80/1120	80/1120
Chassis/power transmission	Front suspension		Single-pivot spring struts with castor angle offset, small positive steering scrub radius, lateral force compensation, brake dive reduction			
	Rear suspension		Independent, with semi-trailing arms (15° trail angle), separate springs and shock absorbers, squat compensation			
	Brakes, front		Single-piston floating caliper disc brakes		Single-piston floating calipers with vented discs	
	rear		Drums			Single-piston floating caliper disc brakes with integral handbrake drums
	Steering		Rack and pinion, ratio 21.4:1	Rack and pinion, ratio 21.4:1	Rack and pinion, ratio 21.4:1	Rack and pinion, ratio 21.4:1 power assistance dependent on engine speed
	Final drive ratio		3.91 (3.91)	4.10 (4.10)	4.10 (4.10)	4.27 (4.27)
	Gear ratios I	:1	3.72 (2.48)	3.72 (2.48)	3.72 (2.48)	3.72 (2.48)
	II	:1	2.02 (1.48)	2.02 (1.48)	2.02 (1.48)	2.02 (1.48)
	III	:1	1.32 (1.0)	1.32 (1.0)	1.32 (1.0)	1.32 (1.0)
	IV	:1	1.00 (0.73)	1.00 (0.73)	1.00 (0.73)	1.00 (0.73)
	V	:1	0.80 (–)	0.80 (–)	0.80 (–)	0.80 (–)
	Reverse	:1	3.45 (2.09)	3.45 (2.09)	3.45 (2.09)	3.45 (2.09)
	Tyres		175/70 R 14 T	195/65 R 14 H	195/65 R 14 H	195/65 R 14 H
	Wheels		5½ J x 14/steel	5½ J x 14/steel	5½ J x 14/steel	5½ J x 15/steel
Performance	Power-weight ratio	kg/kW	15.9 (16.2)	12.5 (12.8)	11.8 (12.1)	13.5
	Torque-weight ratio	kg/Nm	7.5 (7.6)	6.5 (6.6)	6.5 (6.6)	7.4
	Output per litre	kW	37.4	47.4	47.7	47.7
	Torque per litre	Nm	79.3	91.9	87.4	87.4
	Acceleration, 0–100 km/h	s	12.2 (14.2)	10.8 (11.9)	10.2 (11.5)	11.0 (12.5)
	0–1000 m	s	33.8 (35.6)	32.2 (33.6)	31.3 (33.1)	32.2 (33.8)
	80–120 km/h in direct gear	s	12.7	10.5	10.2	10.5
	Top speed	km/h	176 (172)	189 (186)	198 (193)	195 (190)
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h	l/100 km	6.0/–	6.0/–	6.7/–	7.0/–
	– at steady 120 km/h		7.8/–	7.9/–	8.7/–	9.0/–
	– urban cycle		9.6/–	9.7/–	12.3/–	12.6/–
	– average		7.8/–	7.9/–	9.2/–	9.6/–
	4-speed automatic transmission without/with EH control					
	– at steady 90 km/h	l/100 km	6.2/–	6.0/–	6.8/–	7.1/–
	– at steady 120 km/h		8.1/–	8.0/–	8.7/–	9.0/–
	– urban cycle		9.6/–	9.8/–	12.4/–	12.7/–
	– average		8.0/–	7.9/–	9.3/–	9.6/–

( ) Figures in brackets: with automatic transmission
1) With standard gearbox, related to average ECE test consumption
2) Unladen weight and max weight 20 kg higher on 4-door cars
3) An increase is possible if certain conditions are satisfied
5) With hardtop, probable roof load 30 kg
** Not offered for sale in the Federal Republic of Germany

Date of issue: 9/87

	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		325i**	325i Convertible**	325iX**	M 3**
Body dimensions and weights	No of doors		2/4	2	2/4	2
	No of seats		5	4	5	4
	Length/width/height (unladen)	mm	4325/1645/1380	4325/1645/1370	4325/1662/1400	4345/1680/1370
	Wheelbase	mm	2570	2570	2570	2565
	Track, front	mm	1407	1407	1420	1412
	rear	mm	1415	1415	1416	1424
	Turning circle	m	10.5	10.5	11.1	11.1
	Fuel tank capacity/range[1]	l/km	64/705	62/675	64/675	70/845
	Unladen weight[2]	kg	1180 (1200)	1310 (1330)	1280 (1300)	1200 (–)
	Max load	kg	460 (460)	400 (400)	460 (460)	400 (–)
	Max permissible weight[2]	kg	1640 (1660)	1710 (1730)	1740 (1760)	1600 (–)
	Max trailer load[3]					
	– braked, max gradient 12%	kg	1200	1200	1200	–
	– unbraked	kg	500	500	500	–
	Max roof load	kg	75	–[6]	75	75
	Max trailer nose weight	kg	50	50	50	–
	Luggage capacity, VDA test	l	404	312	404	420
Engine	Layout		Inline	Inline	Inline	Inline
	No of cylinders		6	6	6	4
	Mixture preparation		Motronic	Motronic	Motronic	ML-Motronic, 4 valves/cyl.
	Displacement, effective	cc	2494	2494	2494	2302
	Bore/stroke	mm	84/75	84/75	84/75	93,4/84
	Compression ratio/fuel grade	:l	9.4/premium unleaded	9.4/premium unleaded	9.4/premium unleaded	10.5/premium unleaded
	Max output	kW/bhp	126/171	126/171	126/171	147/200
	– at engine speed	rpm	5800	5800	5800	6750
	Max torque	Nm	226	226	226	240
	– at engine speed	rpm	4000	4000	4000	4750
El.	Battery	Amp/h	66[5]	50	66[5]	66[5]
	Alternator	Amp/W	80/1120	80/1120	80/1120	90/1260
Chassis/power transmission	Front suspension		Single-pivot spring struts with castor angle offset, small positive steering scrub radius, lateral force compensation, brake dive reduction; BMW M 3 with increased castor; BMW 325 iX with negative steering scrub radius			
	Rear suspension		Independent, with semi-trailing arms (15° trail angle), separate springs and shock absorbers, squat compensation			
	Brakes, front		Single-piston floating caliper disc brakes with vented discs; antilock braking system (ABS)			
	rear		Single-piston floating caliper disc brakes with integral handbrake drums; antilock braking system (ABS)			
	Steering		Rack and pinion, ratio 21.4:1	Rack and pinion, ratio 21.4:1	Rack and pinion, ratio 20.5:1	Rack and pinion, ratio 21.4:1
			power assistance dependent on engine speed			
	Final drive ratio		3.64[4] (3.64)	3.64[4] (3.64)	3.64[4] (3.73)	–/3.25 (–)
	Gear ratios I	:1	3.83 (2.48)	3.83 (2.48)	3.83 (2.48)	–/3.72 (–)
	II	:1	2.20 (1.48)	2.20 (1.48)	2.20 (1.48)	–/2.40 (–)
	III	:1	1.40 (1.0)	1.40 (1.0)	1.40 (1.0)	–/1.77 (–)
	IV	:1	1.00 (0.73)	1.00 (0.73)	1.00 (0.73)	–/1.26 (–)
	V	:1	0.81 (–)	0.81 (–)	0.81 (–)	–/1.00 (–)
	Reverse	:1	3.46 (2.09)	3.46 (2.09)	3.46 (2.09)	–/4.23 (–)
	Tyres		195/65 VR 14	195/65 VR 14	195/65 VR 14	205/55 VR 15
	Wheels		5½ J x 14/steel	6 J x 14/alloy	6 J x 14/steel	7 J x 15/alloy
Performance	Power-weight ratio	kg/kW	9.4 (9.5)	10.4 (10.6)	10.2 (10.3)	8.2
	Torque-weight ratio	kg/Nm	5.2 (5.3)	5.8 (5.9)	5.7 (5.8)	5.0
	Output per litre	kW	50.5	50.5	50.5	63.9
	Torque per litre	Nm	90.6	90.6	90.6	104.3
	Acceleration, 0–100 km/h	s	8.3 (9.8)	8.6 (10.3)	9.0 (10.9)	6.7 (–)
	0–1000 m	s	28.9 (30.7)	29.4 (31.2)	29.9 (32.0)	27.2 (–)
	80–120 km/h in direct gear	s	8.9/7.9	9.5/8.6	10.3/9.3	–/7.1 (–)
	Top speed	km/h	220 (213)	217 (207)	214 (204)	235 (–)
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h	l/100 km	6.6/7.2	6.7/7.3	7.1/7.6	–/5.8
	– at steady 120 km/h		8.2/8.6	8.3/8.8	8.9/9.3	–/7.5
	– urban cycle		12.5/12.6	12.6/12.7	12.6/12.7	–/11.6
	– average		9.1/9.5	9.2/9.6	9.5/9.9	–/8.3
	4-speed automatic transmission without/with EH control					
	– at steady 90 km/h	l/100 km	6.6/6.6	6.8/6.8	7.2/7.2	–/–
	– at steady 120 km/h		8.3/8.3	8.5/8.5	9.0/9.0	–/–
	– urban cycle		12.5/12.4	12.7/12.6	12.7/12.6	–/–
	– average		9.1/9.1	9.3/9.3	9.6/9.6	–/–

( ) Figures in brackets: with automatic transmission
1) With standard gearbox, related to average ECE test consumption
2) Unladen weight and max weight 20 kg higher on 4-door cars
3) An increase is possible if certain conditions are satisfied
4) 3.91:1 with sports gearbox option
5) Battery in luggage compartment
6) With hardtop, probable roof load 30 kg
* Also with preparation for catalytic converter installation as an option
** Not offered for sale in the Federal Republic of Germany

Date of issue: 9/87

	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		518 i	520 i	525 e	525 i
Body Dimensions and weights	No of doors		4	4	4	4
	No of seats		5	5	5	5
	Length/width/height (unladen)	mm	4620/1700/1415	4620/1700/1415	4620/1700/1415	4620/1700/1415
	Wheelbase	mm	2625	2625	2625	2625
	Track, front	mm	1430	1430	1430	1430
	rear	mm	1470	1460	1460	1460
	Turning circle	m	10.5	10.5	10.5	10.5
	Fuel tank capacity/range[1]	l/km	70/880	70/760	70/860	70/700
	Unladen weight[2]	kg	1160 (–)	1270 (1290)	1280 (1300)	1310 (1330)
	Max load	kg	510 (–)	510 (510)	510 (510)	510 (510)
	Max permissible weight	kg	1670 (–)	1780 (1800)	1790 (1810)	1820 (1840)
	Max trailer load[2]					
	– braked, max gradient 12%	kg	1200	1400	1400(1500)	1500
	– unbraked	kg	500	500	500	500
	Max roof load	kg	75	75	75	75
	Max trailer nose weight	kg	50	50	50	50
	Luggage capacity, VDA test	l	460	460	460	460
Engine	Layout		Inline	Inline	Inline	Inline
	No of cylinders		4	6	6	6
	Mixture preparation		L-Jetronic	L-Jetronic	Motronic	L-Jetronic
	Displacement, effective	cc	1766	1990	2693	2494
	Bore/stroke	mm	89/71	80/66	84/81	86/71,6
	Compression ratio/fuel grade	:1	9.5/regular, unleaded	9.8/regular, unleaded	10.2/regular, unleaded	9.6/regular, unleaded
	Max output	kW/bhp	77/105	95/129	95/129	110/150
	– at engine speed	rpm	5800	6000	4250	5500
	Max torque	Nm	145	174	240	215
	– at engine speed	rpm	4500	4000	3250	4000
El.	Battery	Amp/h	44	55	66	55
	Alternator	Amp/W	80/1120	80/1120	80/1120	80/1120
Chassis/power transmission	Front suspension		Double-pivot spring struts with castor angle offset, small positive steering scrub radius, lateral force compensation, brake dive reduction			
	Rear suspension		Independent, with semi-trailing arms (20° trail angle)	Independent, with semi-trailing arms (13° trail angle), additional wheel locating link		
	Brakes, front		Single-piston floating calipers	Single-piston floating calipers with vented discs		
	rear		Drums	Single-piston floating calipers with integrated handbrake drums		
	Steering		Gemmer 21.3:1	Ball and nut, with hydraulic power assistance dependent on engine speed 16.2:1		
	Final drive ratio		4.10 (–)	4.10 (3.91)	2.93 (3.07)	3.64 (3.64)
	Gear ratios I	:1	3.72 (–)	3.72 (2.73)	3.83 (2.48)	3.83 (2.48)
	II	:1	2.02 (–)	2.02 (1.56)	2.20 (1.48)	2.20 (1.48)
	III	:1	1.32 (–)	1.32 (1.00)	1.40 (1.00)	1.40 (1.00)
	IV	:1	1.00 (–)	1.00 (0.73)	1.00 (0.73)	1.00 (0.73)
	V	:1	0.80 (–)	0.80 (–)	0.81 (–)	0.81 (–)
	Reverse	:1	3.45 (–)	3.45 (2.09)	3.46 (2.09)	3.46 (2.09)
	Tyres		175 R 14 T	195/70 R 14 H	195/70 R 14 H	200/60 R 390 H
	Wheels		5½ J x 14/steel	6 J x 14/steel	6 J x 14/steel	165 TR 390/ light-alloy
Performance	Power-weight ratio	kg/kW	15.1	13.4 (13.6)	13.5 (13.7)	11.9 (12.1)
	Torque-weight ratio	kg/Nm	8.0	7.2 (7.4)	5.3 (5.4)	6.1 (6.2)
	Output per litre	kW	43.6	47.7	35.3	44.1
	Torque per litre	Nm	82.1	87.4	89.1	86.2
	Acceleration, 0–100 km/h	s	12.6 (–)	11.4 (13.3)	10.7 (12.2)	9.8 (11.9)
	0–1000 m	s	34.0 (–)	32.6 (35.0)	32.2 (33.7)	31.0 (33.1)
	80–120 km/h in direct gear	s	14.1	12.4	12.5	12.0
	Top speed	km/h	175 (–)	190 (184)	190 (184)	201 (195)
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h		6.1/–	6.7/–	5.8/–	7.1/–
	– at steady 120 km/h		8.0/–	8.7/–	7.4/–	9.2/–
	– urban cycle		9.9/–	12.1/–	11.0/–	13.7/–
	– average		8.0/–	9.2/–	8.1/–	10.0/–
	4-speed automatic transmission without/with EH control					
	– at steady 90 km/h		–/–	6.4/–	6.0/6.0	7.0/–
	– at steady 120 km/h		–/–	8.3/–	7.5/7.5	9.2/–
	– urban cycle		–/–	11.4/–	11.3/11.2	13.8/–
	– average		–/–	8.7/–	8.3/8.2	10.0/–

( ) Figures in brackets: with automatic transmission
1) With standard gearbox, related to average ECE test consumption
2) An increase is possible if certain conditions are satisfied

Date of issue: 9/87

	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		528 i	535 i	M 535 i	M 5
Body Dimensions and weights	No of doors		4	4	4	4
	No of seats		5	5	5	5
	Length/width/height (unladen)	mm	4620/1700/1415	4620/1710/1397	4604/1710/1397	4620/1700/1397
	Wheelbase	mm	2625	2628	2628	2625
	Track, front	mm	1430	1430	1430	1430
	rear	mm	1460	1460	1460	1465
	Turning circle	m	10.5	11.05	11.05	11.3
	Fuel tank capacity/range[1]	l/km	70/690	70/670	70/670	70/620
	Unladen weight[2]	kg	1340 (1360)	1370 (1390)	1390 (1410)	1430 (–)
	Max load	kg	510 (510)	510 (510)	510 (510)	470 (–)
	Max permissible weight	kg	1850 (1870)	1880 (1900)	1900 (1920)	1900 (–)
	Max trailer load[2]					
	– braked, max gradient 12%	kg	1500	1500	1500	Towing trailer
	– unbraked	kg	500	500	500	not permitted
	Max roof load	kg	75	75	75	75
	Max trailer nose weight	kg	50	50	50	–
	Luggage capacity, VDA test	l	460	460	460	450
Engine	Layout		Inline	Inline	Inline	Inline
	No of cylinders		6	6	6	6
	Mixture preparation		L-Jetronic	Motronic	Motronic	Motronic 4 valves per cyl.
	Displacement, effective	cc	2788	3430	3430	3453
	Bore/stroke	mm	86/80	92/86	92/86	93,4/84
	Compression ratio/fuel grade	:1	9.3/regular, unleaded	10.0/regular, unleaded	10.0/regular, unleaded	10.5/regular, unleaded
	Max output	kW/bhp	135/184	160/218	160/218	210/286
	– at engine speed	rpm	5800	5500	5500	6500
	Max torque	Nm	240	310	310	340
	– at engine speed	rpm	4200	4000	4000	4500
El.	Battery	Ah	55	66	66	90[4]
	Alternator	A/W	80/1120	80/1120	80/1120	90/1260
Chassis/power transmission	Front suspension		Double-pivot spring struts with castor angle offset, small positive steering scrub radius, lateral force compensation, brake dive reduction			
	Rear suspension		Independent, with semi-trailing arms (13° trail angle), additional wheel locating link			
				Single-tube gas-filled shock absorbers	Firm suspension settings with single-tube gas-filled shock absorbers	
	Brakes, front		Single-piston floating calipers with thicker (25 mm) ventilated discs and modified calipers; antilock braking system (ABS)			4-piston fixed calipers, vented discs, antilock braking system (ABS)
	rear		Single-piston floating calipers with integrated handbrake drums; antilock braking system (ABS)			
	Steering		Ball and nut, with hydraulic power assistance dependent on engine speed			
			16.2:1	15.2:1	15.1:1	15.1:1
	Final drive ratio		3.46[3] (3.46)	3.07 (3.07)	3.07 (3.07)	–/3.73 (–)
	Gear ratios I	:1	3.83 (2.48)	3.83 (2.48)	3.83 (2.48)	–/3.51 (–)
	II	:1	2.20 (1.48)	2.20 (1.48)	2.20 (1.48)	–/2.08 (–)
	III	:1	1.40 (1.00)	1.40 (1.00)	1.40 (1.00)	–/1.35 (–)
	IV	:1	1.00 (0.73)	1.00 (0.73)	1.00 (0.73)	–/1.00 (–)
	V	:1	0.81 (–)	0.81 (–)	0.81 (–)	–/0.81 (–)
	Reverse	:1	3.46 (2.09)	3.46 (2.09)	3.46 (2.09)	–/3.71 (–)
	Tyres		200/60 VR 390	220/55 VR 390	220/55 VR 390	220/55 VR390
	Wheels		165 TR 390/ light-alloy	165 TR 390/ light-alloy	165 TR 390/ light-alloy	165 TR 390/ light-alloy
Performance	Power-weight ratio	kg/kW	9.9 (10.1)	8.6 (8.7)	8.7 (8.8)	6.8
	Torque-weight ratio	kg/Nm	5.6 (5.7)	4.4 (4.5)	4.5 (4.5)	4.2
	Output per litre	kW	48.4	46.6	46.6	60.8
	Torque per litre	Nm	86.1	90.4	90.4	98.4
	Acceleration, 0–100 km/h	s	8.4 (10.8)	7.2 (8.9)	7.2 (8.9)	6.5 (–)
	0–1000 m	s	29.4 (31.6)	28.0 (29.6)	28.0 (29.6)	26.8 (–)
	80–120 km/h in direct gear	s	10.9	9.8	9.8	7.7
	Top speed	km/h	215 (208)	225 (219)	230 (223)	245 (–)
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h		7.0/7.9	7.3/8.3	7.3/8.3	–/7.8
	– at steady 120 km/h		9.0/9.6	9.3/10.2	9.0/9.9	–/9.7
	– urban cycle		14.7/15.5	15.0/16.0	15.0/16.0	–/16.5
	– average		10.2/11.0	10.5/11.5	10.4/11.4	–/11.3
	4-speed automatic transmission without/with EH control					
	– at steady 90 km/h		6.9/–	–/7.1	–/7.1	–/–
	– at steady 120 km/h		9.0/–	–/9.1	–/8.8	–/–
	– urban cycle		14.9/–	–/15.9	–/15.9	–/–
	– average		10.3/–	–/10.7	–/10.6	–/–

( ) Figures in brackets: with automatic transmission
1) With standard gearbox, related to average ECE test consumption
2) An increase is possible if certain conditions are satisfied
3) with sports gearbox optuion, 3.25:1
4) Battery in luggage compartment

Date of issue: 9/87

	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		524 d	524 td		
Body Dimensions and weights	No of doors		4	4		
	No of seats		5	5		
	Length/width/height (unladen)	mm	4620/1700/1415	4620/1700/1415		
	Wheelbase	mm	2625	2625		
	Track, front	mm	1430	1430		
	rear	mm	1470	1460		
	Turning circle	m	10.5	10.5		
	Fuel tank capacity/range [1]	l/km	70/950	70/990		
	Unladen weight [2]	kg	1330 (–)	1355 (1375)		
	Max load	kg	510 (–)	510 (510)		
	Max permissible weight	kg	1840 (–)	1865 (1885)		
	Max trailer load [2]					
	– braked, max gradient 12%	kg	1200	1500		
	– unbraked	kg	500	500		
	Max roof load	kg	75	75		
	Max trailer nose weight	kg	50	50		
	Luggage capacity, VDA test	l	460	460		
Engine	Layout		Inline	Inline		
	No of cylinders		6	6		
	Mixture preparation		Fuel injection into pre-combustion chambers	Fuel injection into pre-combustion chambers, turbocharger		
	Displacement, effective	cm^3	2443	2443		
	Bore/stroke	mm	80/81	80/81		
	Compression ratio/fuel grade	:1	22.0/diesel oil	22.0/diesel oil		
	Max output	kW/bhp	63/86	85/115		
	– at engine speed	min^{-1}	4600	4800		
	Max torque	Nm	152	210		
	– at engine speed	min^{-1}	2500	2400		
El.	Battery	Ah	90	90		
	Alternator	A/W	80/1120	80/1120		
Chassis/power transmission	Front suspension		Double-pivot spring struts with castor angle offset, small positive steering scrub radius, lateral force compensation, brake dive reduction			
	Rear suspension		Independent, with semi-trailing arms (20° trail angle)	Independent, with semi-trailing arms (13° trail angle) and additional wheel locating link		
	Brakes, front		Single-piston floating caliper disc brakes with vented discs			
	rear		Single-piston floating caliper disc brakes with integrated handbrake drums			
	Steering		Ball and nut, with hydraulic power assistance dependent on engine speed			
			16.2:1	16.2:1		
	Final drive ratio		3.91 (–)	3.15 (3.15)		
	Gear ratios I	:1	3.72 (–)	4.35 (2.73)		
	II	:1	2.02 (–)	2.33 (1.56)		
	III	:1	1.32 (–)	1.39 (1.00)		
	IV	:1	1.00 (–)	1.00 (0.73)		
	V	:1	0.80 (–)	0.81 (–)		
	Reverse	:1	3.45 (–)	3.73 (2.09)		
	Tyres		175 R 14 T	195/70 R 14 H		
	Wheels		5½ J x 14/steel	6 J x 14/steel		
Performance	Power-weight ratio	kg/kW	21.1	15.9 (16.1)		
	Torque-weight ratio	kg/Nm	8.8	6.5 (6.5)		
	Output per litre	kW	25.8	34.8		
	Torque per litre	Nm	62.2	86.0		
	Acceleration, 0–100 km/h	s	18.1 (–)	12.9 (13.6)		
	0–1000 m	s	38.6 (–)	34.3 (35.7)		
	80–120 km/h in direct gear	s	17.1	13.7		
	Top speed	km/h	164 (–)	180 (175)		
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h	l/100 km	5.6/–	5.2/–		
	– at steady 120 km/h		7.5/–	7.0/–		
	– urban cycle		9.2/–	9.0/–		
	– average		7.4/–	7.1/–		
	4-speed automatic transmission without/with EH control					
	– at steady 90 km/h	l/100 km	–/–	5.2/–		
	– at steady 120 km/h		–/–	7.0/–		
	– urban cycle		–/–	9.5/–		
	– average		–/–	7.2/–		

( ) Figures in brackets: with automatic transmission
1) With standard gearbox, related to average ECE test consumption
2) An increase is possible if certain conditions are satisfied

Date of issue: 9/87

	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		635 CSi**	M 635 CSi		
Body Dimensions and weights	No of doors		2	2		
	No of seats		4	4		
	Length/width/height (unladen)	mm	4815/1725/1365	4815/1725/1353		
	Wheelbase	mm	2625	2625		
	Track, front	mm	1430	1430		
	rear	mm	1460	1464		
	Turning circle	m	11.7	11.7		
	Fuel tank capacity/range[1]	l/km	70/610	70/620		
	Unladen weight	kg	1460 (1480)	1500 (–)		
	Max load	kg	420 (400)	380 (–)		
	Max permissible weight	kg	1880 (1900)	1880 (–)		
	Max trailer load[2]					
	– braked, max gradient 12%	kg	1600	–		
	– unbraked	kg	650	–		
	Max roof load	kg	75	75		
	Max trailer nose weight	kg	50	–		
	Luggage capacity, VDA test	l	413	335		
Engine	Layout		Inline	Inline		
	No of cylinders		6	6		
	Mixture preparation		Motronic	Motronic 4 valves per cyl.		
	Displacement, effective	cc	3430	3453		
	Bore/stroke	mm	92/86	93,4/84		
	Compression ratio/fuel grade	:1	9.2/premium unleaded	10.5/premium		
	Max output	kW/bhp	162/220	210/286		
	– at engine speed	rpm	5700	6500		
	Max torque	Nm	315	340		
	– at engine speed	rpm	4000	4500		
El.	Battery	Amp/hh	66	90[3]		
	Alternator	Amp/W	90/1260	90/1260		
Chassis/power transmission	Front suspension		Double-pivot spring struts with castor angle offset, small positive steering scrub radius, lateral force compensation, brake dive reduction			
	Rear suspen		Independent, with semi-trailing arms (13° trail angle), additional wheel locating link			
				Sports suspension settings, single-tube gas-filled shock absorbers		
	Brakes, front		Single-piston fixed calipers with ventilated discs; antilock braking system (ABS)	Four-piston fixed calipers with vented discs, antilock braking system (ABS)		
	rear		Single-piston floating calipers with integrated handbrake drums; antilock braking system (ABS)			
	Steering		Ball and nut, with hydraulic power assistance dependent on engine speed 15.1:1	15.1:1		
	Final drive ratio		3.64 (3.64)	–/3.73 (–)		
	Gear ratios I	:1	3.83 (2.48)	–/3.51		
	II	:1	2.20 (1.48)	–/2.08		
	III	:1	1.40 (1.00)	–/1.35		
	IV	:1	1.00 (0.73)	–/1.00		
	V	:1	0.81 (–)	–/0.81		
	Reverse	:1	3.71 (2.09)	–/3.71		
	Tyres		205/70 VR 14	220/55 VR 390		
	Wheels		6½ J x 14/ light-alloy	165 TR 390/ light-alloy		
Performance	Power-weight ratio	kg/kW	9.0 (9.1)	7.1		
	Torque-weight ratio	kg/Nm	4.6 (4.7)	4.4		
	Output per litre	kW	47.2	60.8		
	Torque per litre	Nm	91.8	98.5		
	Acceleration, 0–100 km/h	s	7.4 (8.4)	6.4 (–)		
	0–1000 m	s	28.0 (29.0)	26.4 (–)		
	80–120 km/h in direct gear	s	8.1	–/7.7		
	Top speed	km/h	230 (225)	255 (–)		
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h	l/100 km	7.9/–	–/7.8		
	– at steady 120 km/h		9.9/–	–/9.7		
	– urban cycle		16.8/–	–/16.5		
	– average		11.5/–	–/11.3		
	4-speed automatic transmission without/with EH control					
	– at steady 90 km/h	l/100 km	–/7.8	–/–		
	– at steady 120 km/h		–/9.8	–/–		
	– urban cycle		–/16.9	–/–		
	– average		–/11.5	–/–		

( ) Figures in brackets: with automatic transmission

** Not to be offered for sale in the Federal Republic of Germany

1) With standard gearbox, related to average ECE test consumption

2) An increase is possible if certain conditions are satisfied

3) Battery in luggage compartment

Date of issue: 9/87

	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		730 i	735 i	735 iL	
Body Dimensions and weights	No of doors		4	4	4	
	No of seats		5	5	5	
	Length/width/height (unladen)	mm	4910/1845/1411	4910/1845/1411	5024/1845/1400	
	Wheelbase	mm	2832	2832	2947	
	Track, front	mm	1527	1527	1528	
	rear	mm	1550	1550	1556	
	Turning circle	m	11.6	11.6	12.0	
	Fuel tank capacity/range [1]	l/km	90/835	90/810	102/905	
	Unladen weight	kg	1600 (1600)	1600 (1630)	1660 (1680)	
	Max load	kg	520 (520)	520 (520)	520 (520)	
	Max permissible weight	kg	2130 (2150)	2150 (2170)	2180 (2200)	
	Max trailer load [2]					
	– braked, max gradient 12%	kg	1600	1600	1600	
	– unbraked	kg	650	650	650	
	Max roof load	kg	100	100	100	
	Max trailer nose weight [2]	kg	50	50	50	
	Luggage capacity, VDA test	l	500	500	500	
Engine	Layout		Inline	Inline	Inline	
	No of cylinders		6	6	6	
	Mixture preparation		Motronic	Motronic	Motronic	
	Displacement, effective	cc	2986	3430	3420	
	Bore/stroke	mm	89/80	92/86	92/86	
	Compression ratio/fuel grade	:1	9,2/premium, unleaded	9,2/premium, unleaded	9,2/premium unleaded	
	Max output	kW/bhp	145/197	162/220	162/220	
	– at engine speed	rpm	5800	5700	5700	
	Max torque	Nm	275	315	315	
	– at engine speed	rpm	4000	4000	4000	
El.	Battery	Amp/h	84	84	84	
	Alternator	Amp/W	90/1260	90/1260	90/1260	
Chassis/power transmission	Front suspension		Double-pivot spring struts with castor angle offset, small positive steering scrub radius, lateral force compensation, brake dive reduction			
	Rear suspension		Independent, with precision semi-trailing arms (13° trail angle), additional wheel locating link; with squat reductio and anti-dive compensation			
	Brakes, front		Single-piston floating calipers with ventilated discs; antilock braking system (ABS)			
	rear		Single-piston floating calipers with integrated handbrake drums; antilock braking system (ABS)			
	Steering		Ball and nut, with hydraulic power assistance dependent on engine speed; ratio 14.5:1			
	Final drive ratio		3.64 (3.64)	3.45 (3.45)	3.45 (3.45)	
	Gear ratios I	:1	3.83 (2.48)	3.83 (2.48)	3.83 (2.48)	
	II	:1	2.20 (1.48)	2.20 (1.48)	2.20 (1.48)	
	III	:1	1.40 (1.0)	1.40 (1.0)	1.40 (1.0)	
	IV	:1	1.00 (0.73)	1.00 (0.73)	1.00 (0.73)	
	V	:1	0.81 (–)	0.81 (–)	0.81 (–)	
	Reverse	:1	3.46 (2.09)	3.46 (2.09)	3.46 (2.09)	
	Tyres		205/65 VR 15	225/60 VR 15	225/60 VR 15	
	Wheels		6½ J x 15/steel	7 J x 15/ light-alloy	7 J x 15/ light-alloy	
Performance	Power-weight ratio	kg/kW	11.0 (11.0)	9.9 (10.1)	10.2 (10.4)	
	Torque-weight ratio	kg/Nm	5.8 (5.8)	5.1 (5.2)	5.3 (5.3)	
	Output per litre	kW	48.6	47.2	47.2	
	Torque per litre	Nm	92.1	91.8	91.8	
	Acceleration, 0–100 km/h	s	8.9 (10.8)	7.9 (9.2)	7.9 (9.2)	
	0–1000 m	s	29.6 (31.6)	28.5 (29.8)	28.5 (29.8)	
	80–120 km/h in direct gear	s	10.5	9.4	9.4	
	Top speed	km/h	225 (217)	233 (225)	233 (225)	
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h	l/100 km	7.6/–	7.7/–	7.7/–	
	– at steady 120 km/h		9.3/–	9.6/–	9.6/–	
	– urban cycle		15.5/–	15.9/–	16.7/–	
	– average		10.8/–	11.1/–	11.3/–	
	4-speed automatic transmission without/with EH control					
	– at steady 90 km/h	l/100 km	7.4/7.4	/–7.6	–/7.6	
	– at steady 120 km/h		9.2/9.2	/–9.5	–/9.5	
	– urban cycle		16.4/16.4	/–16.7	–/16.7	
	– average		11.0/11.0	/–11.3	–/11.3	

( ) Figures in brackets: with automatic transmission
1) With standard gearbox, related to average ECE test consumption
2) An increase is possible if certain conditions are satisfied

Date of issue: 9/87

	SPECIFICATIONS: BMW AUTOMOBILE MODEL RANGE		750 i	750 iL		
Body Dimensions and weights	No of doors		4	4		
	No of seats		5	5		
	Length/width/height (unladen)	mm	4910/1845/1400	5024/1845/1400		
	Wheelbase	mm	2833	2947		
	Track, front	mm	1528	1528		
	rear	mm	1556	1556		
	Turning circle	m	11.6	12.0		
	Fuel tank capacity/range	l/km	102/770	102/750		
	Unladen weight	kg	(1800)	(1860)		
	Max load	kg	(520)	(520)		
	Max permissible weight	kg	(2320)	(2380)		
	Max trailer load [1]					
	– braked, max gradient 12%	kg	1600	1600		
	– unbraked	kg	650	650		
	Max roof load	kg	100	100		
	Max trailer nose weight [1]	kg	50	50		
	Luggage capacity, VDA test		500	500		
Engine	Layout		V	V		
	No of cylinders		12	12		
	Mixture preparation		Motronic	Motronic		
	Displacement, effective	cc	4988	4988		
	Bore/stroke	mm	84/75	84/75		
	Compression ratio/fuel grade	:1	8.8/regular, unleaded [3]	8.8/regular, unleaded [3]		
	Max output	kW/bhp	220/300	220/300		
	– at engine speed	rpm	5200	5200		
	Max torque	Nm	450	450		
	– at engine speed	rpm	4100	4100		
El.	Battery	Amp/h	85	85		
	Alternator	Amp/W	115/1610	115/1610		
Chassis/power transmission	Front suspension		Double-pivot spring struts with castor angle offset, positive steering scrub radius, lateral force compensation, brake dive reduction			
	Rear suspension		Independent, with precision semi-trailing arms (13° trail angle), additional wheel locating link; with squat reduction and anti-dive compensation·			
	Brakes, front		Single-piston floating calipers with ventilated discs; antilock braking system (ABS)			
	rear		Single-piston floating calipers with ventilated discs and integrated handbrake drums; antilock braking system (ABS)			
	Steering		Ball and nut, with hydraulic power assistance dependent on road speed; (Servotronic); ratio 14.5:1			
	Final drive ratio		(3.15)	(3.15)		
	Gear ratios I	:1	(2.48)	(2.48)		
	II	:1	(1.48)	(1.48)		
	III	:1	(1.0)	(1.0)		
	IV	:1	(0.73)	(0.73)		
	V	:1	–	–		
	Reverse	:1	(2.09)	(2.09)		
	Tyres		225/60 VR 15	225/60 VR 15		
	Wheels		7 J x 15/ligth-alloy	7 J x 15/light-alloy		
Performance	Power-weight ratio	kg/kW	8.1	8.5		
	Torque-weight ratio	kg/Nm	4.0	4.1		
	Output per litre	kW	44.1	44.1		
	Torque per litre	Nm	90.2	90.2		
	Acceleration, 0–100 km/h	s	(7.4)	(7.4)		
	0–1000 m	s	(27.3)	(27.3)		
	80–120 km/h in direct gear	s	–	–		
	Top speed	km/h	(250) [2]	(250) [2]		
Fuel consumption	5-speed/5-speed sports gearbox					
	– at steady 90 km/h					
	– at steady 120 km/h					
	– urban cycle					
	– average					
	4-speed automatic transmission without/with EH control					
	– at steady 90 km/h	l/100 km	–/8.9	–/8.9		
	– at steady 120 km/h		–/11.1	–/11.1		
	– urban cycle		–/19.8	–/20.8		
	– average		–/13.3	–/13.6		

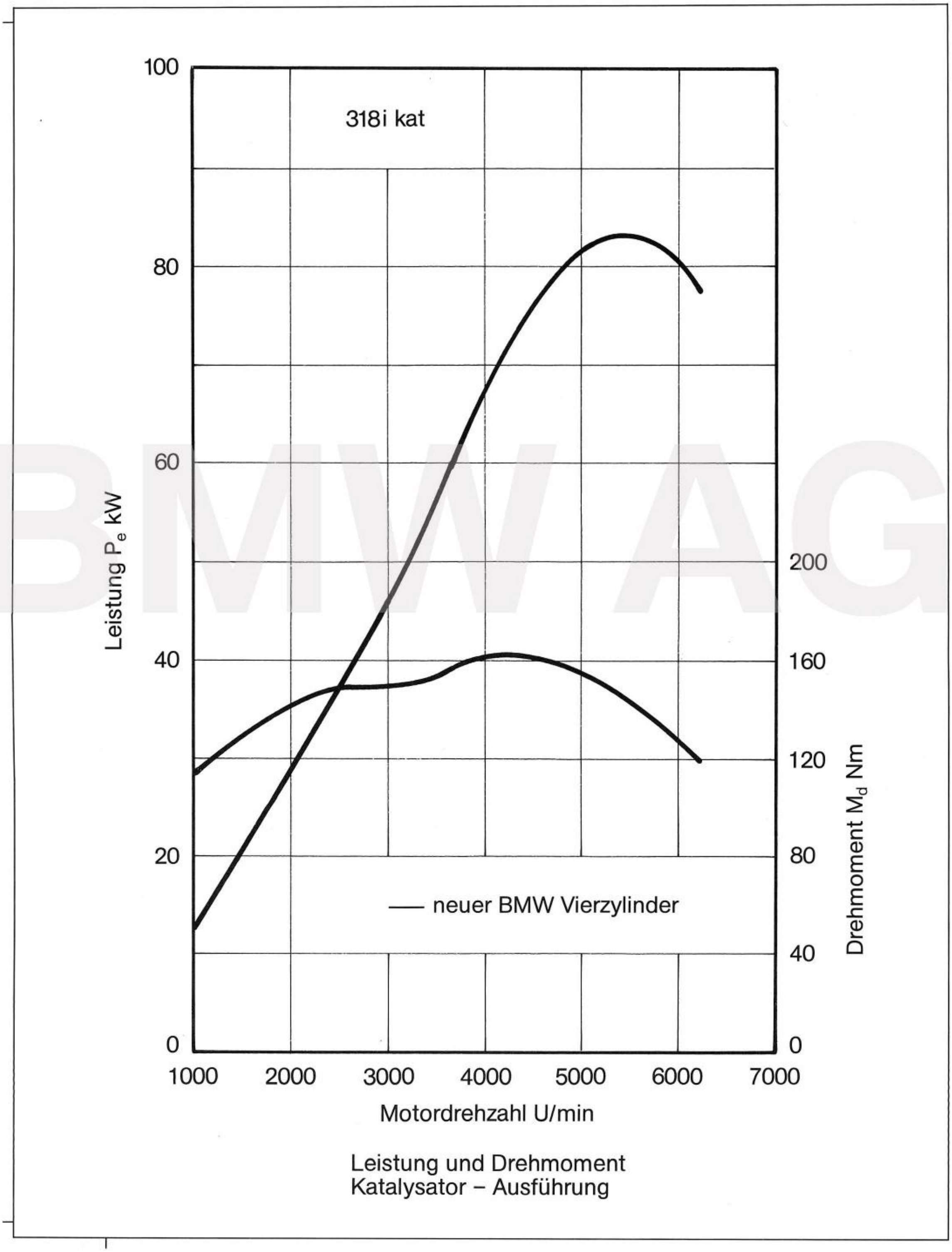
( ) Figures in brackets: with automatic transmission
1) An increase is possible if certain conditions are satisfied
2) Governed
3) All grades of fuel can be used

Date of issue: 9/87

BMW 3er-Reihe

Leistungs- und Drehmomentdiagramm

A 87/1



Leistung und Drehmoment
Katalysator – Ausführung

BMW 3er-Reihe
Leistungs- und Drehmomentdiagramm

BMW series 3
Performance chart

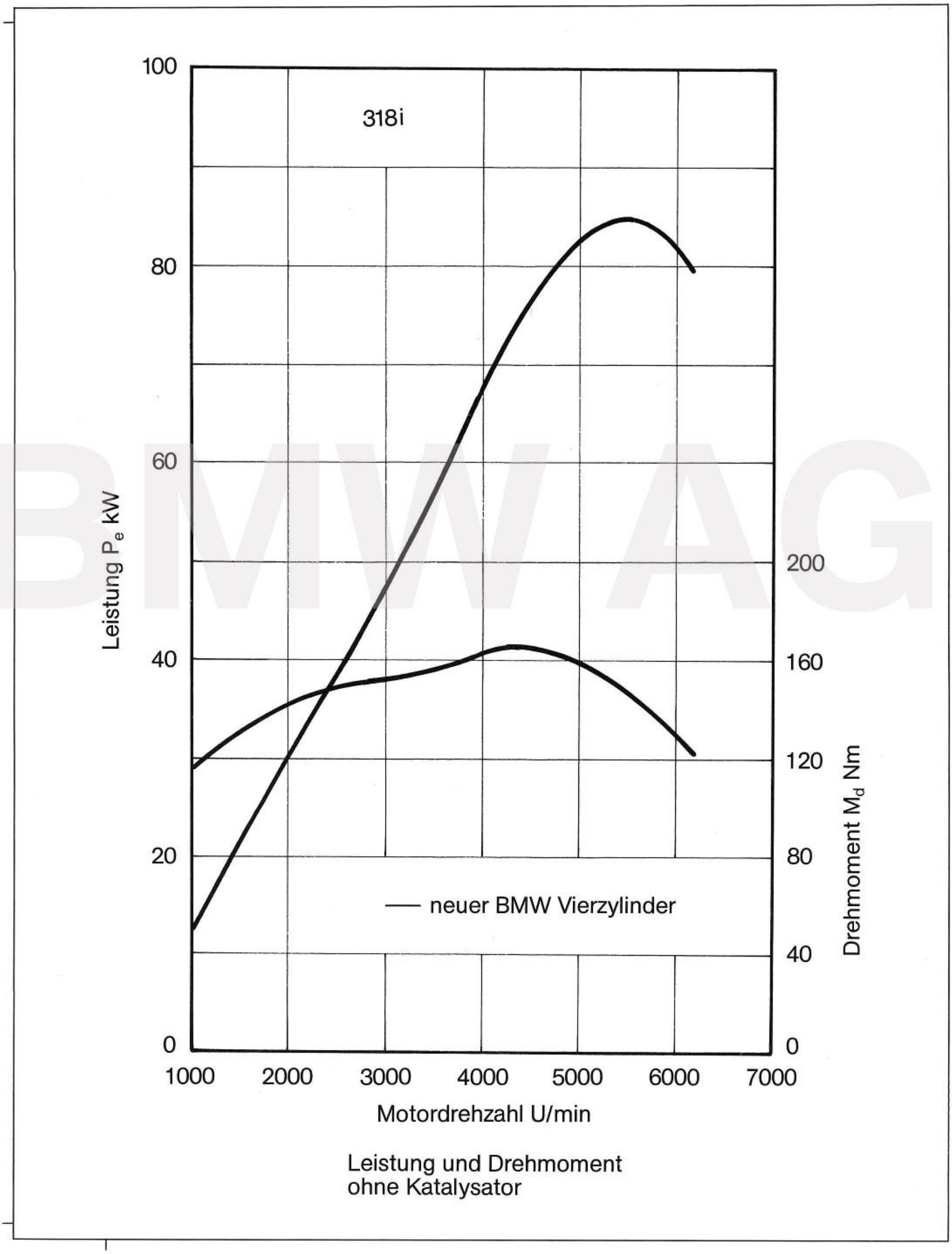
BMW série 3
Courbes caractéristiques de puissance et de couple.

BMW Serie 3
Diagramma della potenza

BMW 3er-Reihe

Leistungs- und Drehmomentdiagramm

A 87/2



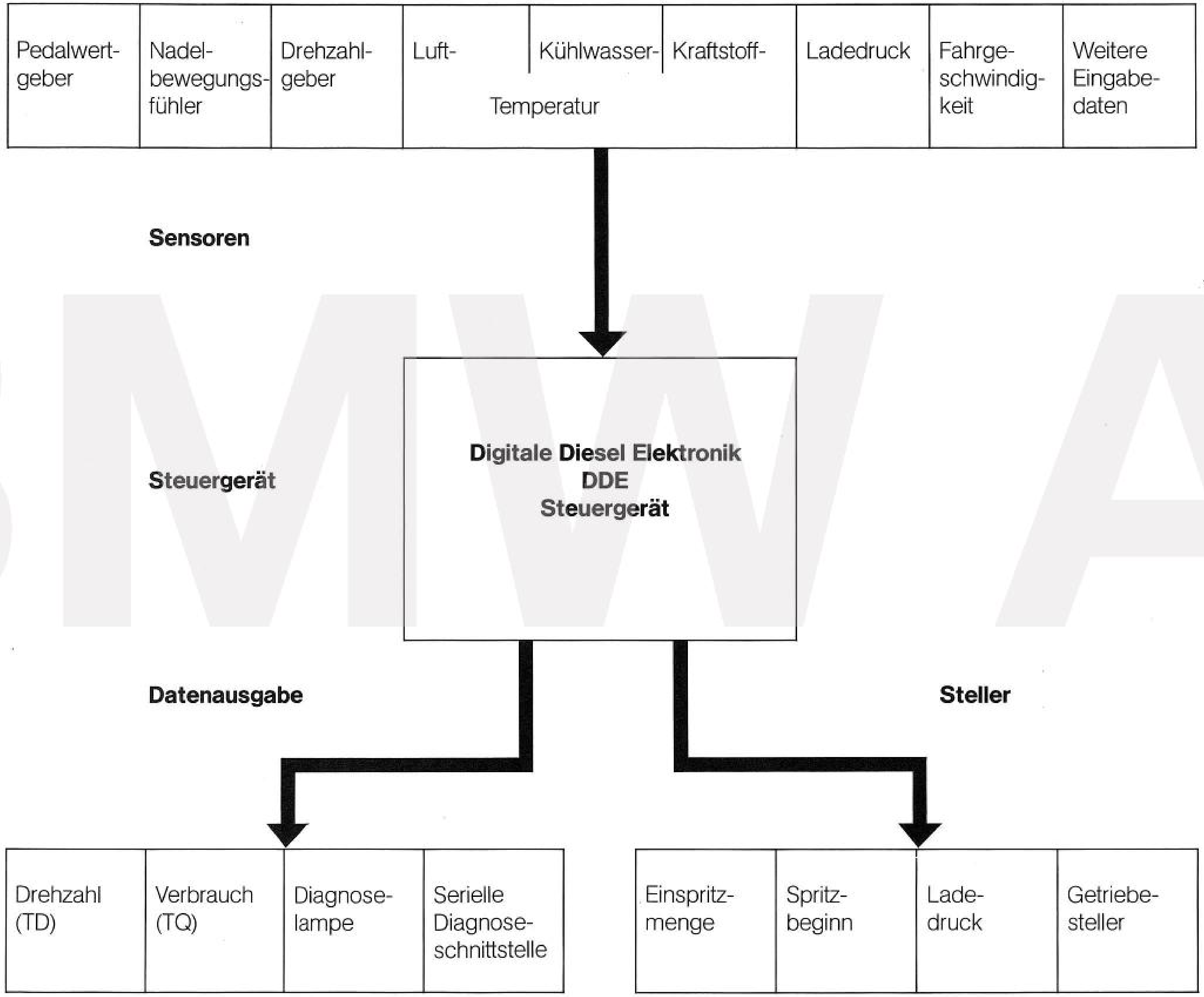
Leistung und Drehmoment
ohne Katalysator

BMW 3er-Reihe
Leistungs- und Drehmomentdiagramm

BMW series 3
Performance chart

BMW série 3
Courbes caractéristiques de puissance et de couple.

BMW Serie 3
Diagramma della potenza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Nadel-bewegungs-fühler
Drehzahl-geber
Luft-
Kühlwasser-
Kraftstoff-
Temperatur
Ladedruck
Fahrge-schwindig-keit
Weitere Eingabe-daten
Sensoren
Steuergerät
Digitale Diesel Elektronik
DDE
Steuergerät
Datenausgabe
Steller
Drehzahl (TD)
Verbrauch (TQ)
Diagnose-lampe
Serielle Diagnose-schnittstelle
Einspritz-menge
Spritz-beginn
Lade-druck
Getriebe-steller

BMW
Digitale-Diesel-Elektronik (DDE)

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Digital Diesel Electronics (DDE)

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