

# BMW Motorrad – new Models and Features at INTERMOT 2006.

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# **1. INTERMOT 2006 – Product Range and new Models/ Features.**



BMW Motorrad is making a proud appearance at the 2006 INTERMOT Motorcycle Show in Cologne, Germany, with the widest and most varied model range in the history of the Company.

The all-new single-cylinder model series is making its world debut with a fascinating range of three brand-new motorcycles quite different in their features and character – the G 650 Xcountry, the G 650 Xchallenge, and the G 650 Xmoto. And at the same time the K-model series is growing further, with the BMW K 1200 R teaming up with its sister model, the K 1200 R Sport, boasting extra sporting and dynamic fairing.

These new models are further enhanced and supplemented by a new, truly exclusive line of accessories: Entering the market in autumn 2006, the new range of BMW Motorrad High Performance Parts will offer truly outstanding, highly functional special accessories for nearly all models within the line-up. These will include top-class and sophisticated lightweight and tuning components made of carbon-fibre, exclusive CNC-milled running gear components, as well as forged wheels.

Within the wide range of BMW Motorrad rider's equipment, a revised and enlarged collection with new features, colours and designs will ensure an even higher standard of function, appeal, and individual style.

The new range of accessories from BMW Motorrad High Performance Parts and the new features offered in the range of BMW Motorrad Rider's Wear are presented in separate press kits.

Including the new single-cylinder model series, the BMW Motorrad model range is now made up of no less than 19 different models. With their characteristic features, these models meet all kinds of customer wishes and preferences absolutely perfectly in the segment above 500 cc, offering a very attractive choice in the respective motorcycle categories.

More sporting than ever before, but without neglecting those classic BMW virtues, all BMW motorcycles offer a host of innovations and trendsetting safety technologies. Indeed, the fully controlled three-way catalytic converter introduced on BMW motorcycles more than 15 years ago is now obviously a primary feature on all models, just like ABS anti-lock brakes.

BMW Motorrad has been the benchmark in active safety for a long time, with all models in the range (except for the BMW HP2 Enduro) becoming available with ABS straight from the factory in the last five years. And in July of last year the fourth generation of ABS anti-lock brake technology ever since the start of production of this feature in 1989 was presented to the international press together with BMW Motorrad's new ASC Automatic Stability Control. Together, these two systems once again underline the leadership in technology of BMW Motorrad and the Company's leading position in the area of active motorcycle safety.

The current model range is younger than ever before – with the exception of the K 1200 LT Luxury Tourer maintaining the same features as in the past, not one single model has been in the market for more than 2½ years. Based on a broad range of development activities in recent years, therefore, the entire model line-up has been totally renewed from the ground up ever since the beginning of 2004. And in the same period not only highlights in technology such as the Evo-Paralever and the cast single-unit swing arm in combination with toothed belt drive have been introduced as new features, but also world-first achievements such as the Duolever, the air spring damper system, Electronic Suspension Adjustment (ESA) and mass compensation via the swing arm. Further progressive technologies adapted and carried over from automobile construction, finally, such as anti-knock engine management and xenon headlights, round off the leadership in innovation so characteristic of the brand.

## **2. The new Single-Cylinder BMW G 650 X Model Series. Short Version**



Introducing the new range of single-cylinder models, BMW Motorrad is broadening its model line-up with a clear focus on additional target groups. Proceeding from the same technical foundation, the Company has created three new motorcycles absolutely different in their features and characteristics: the G 650 Xchallenge Hard Enduro, G 650 Xmoto Street Moto, and the G 650 Xcountry Scrambler.

With their outstanding product substance, their purist looks, and their exceptionally sporting riding characteristics, these single-cylinder models are filling attractive niches in the market. And through their low unladen weight of less than 160 kg or 353 lb according to the DIN standard, they offer dynamic performance for both the connoisseur and the sports-minded rider.

Market launch of the new G 650 X model series is planned in good time for the beginning of the season in spring 2007.

These new machines with the smallest engines in the BMW model range offer particularly the young and young-at-heart motorcycle rider exactly the right entry into the world of BMW motorcycles, but are not entry-level bikes in the conventional sense of the word: On the contrary, the G 650 Xchallenge Hard Enduro will thrill the customer who wishes to really benefit from the enormous offroad potential of his machine. The G 650 Xmoto Street Moto, in turn, with its very impressive active riding qualities, offers the genuine enthusiast a new dimension in riding pleasure.

The G 650 Xcountry Scrambler, finally, stands for carefree riding pleasure and nimble performance both on the road and off the beaten track. Indeed, this unique machine is able to meet all kinds of requirements and offer virtually all riding qualities ranging from city use via country roads and small, winding lanes, all the way to offroad tracks presenting the most challenging requirements.

The G 650 Xcountry therefore conveys the classic but relaxed feeling of riding a genuine Scrambler as well as the concept of “wandering” on your motorcycle into today’s world in a most modern style. And last but certainly not least, riding pleasure is guaranteed under all conditions and in every situation, since the G 650 Xcountry offers the same outstanding engine and running gear qualities as its two very sporting “sister models”.

All three of these new models are powered by the single-cylinder carried over from the former F 650 models now optimised for even better performance and minimum weight: In the G 650 X-models, the upgraded engine now develops maximum output of 39 kW (53 hp) at 7,000 rpm, reaching maximum torque of 60 Nm (44 lb-ft) at 5,250 rpm. And it almost goes without saying that the engine's well-known virtues such as superior reliability, motoring refinement, economy, and environmental friendliness have been enhanced to an even higher standard than ever before.

Yet a further improvement is the even more dynamic surge of power from the four-valve engine now made possible by the lighter crankdrive and a number of other modifications. The rear wheel, finally, is driven on all three model variants by an O-ring chain.

The bridge-type tubular frame made of steel with cast aluminium side sections and the bolted-on aluminium rear frame, together with the rear-wheel swing arm made of cast light alloy and a number of other high-quality components, characterise the suspension and running gear concept of the entire G 650 X model series – all components are the same on all three models.

Intelligent lightweight technology with a high degree of overall integration of the various components allows particularly low weight for a motorcycle in this class between 156 and 160 kg (344 and 353 lb), depending on the model (DIN unladen weight with 90 per cent tank filling). Dry weight, in turn, is between 144 and 148 kg or 318 and 326 lb.

Various set-ups and versions of the upside-down telescopic fork as well as the rear suspension elements give each model its own special character and riding features. The Xchallenge, for example, comes with a particularly elaborate air damping system, while the Xcountry and the Xmoto feature a spring strut adjustable for length. The wheels and their dimensions, in turn, are tailored to each specific purpose, the Street Moto featuring 17-inch cast light-alloy rims, the Scrambler running on 19- and, respectively, 17-inch spoke wheels, and the Hard Enduro featuring 21- and, respectively, 18-inch spoke wheels highlighting the specific character of each machine.

The brake systems also differ from one model to another: The single-disc front-wheel brakes on the Xcountry and the Xchallenge each measure 300 millimetres or 11.81" in diameter and come in each case with a double-piston brake calliper, while the Xmoto features a four-piston brake calliper interacting with a brake disc measuring 320 millimetres or 12.60" in diameter.

A feature truly unique in the segment of highly specialised single-cylinder motorcycles – but nevertheless quite natural on a BMW – is the optional availability of light and compact two-channel ABS for even greater braking performance. And it also goes without saying that the ABS anti-lock brake system does not in any way restrict the ambitious sports rider wishing to enjoy himself off the beaten track or on special circuits reserved for racing, since the system may be deactivated on demand. And naturally, the offroad rider enjoying the Xchallenge benefits from the same freedom whenever he – or she – wishes.

Again reflecting the usual standard of BMW Motorrad, the G 650 X models may also be customised by a wide range of accessories and special features tailored to each model.

Indeed, the new models are not only the successors to the former single-cylinder machines, but rather round off the range as a whole, since both the F 650 GS and the F 650 GS Dakar are to remain in the model line-up in 2007, with production continuing at BMW Motorrad's Berlin Plant.

**The most important features of the new G 650 X model series  
at a glance:**

- Sporting and emotional design characterised in particular by lightweight features.
- Fast-revving single-cylinder power unit developing maximum output of 39 kW (53 hp) at 7,000 rpm and peak torque of 60 Nm (44 lb-ft) at 5,250 rpm.
- Crankshaft running in anti-friction bearings and an even lighter alternator reducing free mass forces.
- DOHC valve drive with cup tappets and four valves.
- Liquid cooling with an aluminium radiator.
- Electronic BMS-C II engine management with intake manifold injection and dual ignition.
- Stainless-steel exhaust system with three-way catalytic converter and oxygen sensor.
- Dry sump lubrication with the oil tank positioned appropriately for an ideal centre of gravity.
- Close-increment five-speed gearbox with secondary chain drive.
- High-quality running gear components, eloxy-plated aluminium attachments.
- Torsionally-rigid tubular bridge frame with bolted-on aluminium rear frame.
- Stable upside-down telescopic fork, fixed-position tube measuring 45 millimetres (1.77") in diameter.
- Light and highly stable two-unit cast-aluminium swing arm.
- Top-quality spring struts at the rear.

- Low unladen weight between 156 and 160 kg (344 and 353 lb).
- Conified aluminium tubular handlebar.
- Foot brake and gearshift levers made of forged aluminium.
- Fuel tank positioned beneath the seat for an ideal centre of gravity, with good access to the filler pipe.
- High-performance brake system with on-demand ABS as an option.
- Model-specific range of accessories and optional features.

## 2.1 Technical Basis.

The new single-cylinder models were developed under the leadership of BMW in cooperation with Aprilia S.p.A., Noale, Italy (Piaggio Group). Production is by Aprilia in their North Italian Scorzè Plant, naturally fulfilling all of BMW's strict quality standards. And as on the F 650 models, the power unit comes from Austrian specialist Rotax, again following the specifications and requirements made by BMW Motorrad.

In their overall concept, the three new models, using largely the same parts and components on the engine and frame as well as the same main features, seek to offer a very different and distinctive character in each case. The technical distinctions and unique features characteristic of each model are described in greater detail in Section 2.2.

### **Optimised in weight, power and performance – the single-cylinder power unit.**

The truly convincing single-cylinder power unit already featured in the existing BMW F 650 model series – to this day the benchmark in its class in terms of refinement, smoothness, fuel economy, and emission control – sets the foundation for the engines in all new G 650 X models.

Reflecting the different sporting requirements and demands made of each model, a number of components have been modified to reduce the weight of the new motorcycles by approximately 2 kg, enhancing the engine's fast-revving response and performance and boosting engine output by 2 kW. As a result, the power unit not only offers maximum output increased to 39 kW or 53 hp at 7,000 rpm and peak torque of 60 Nm or 44 lb-ft at 5,250 rpm, but also even more dynamic performance and a greater athletic character in every respect.

Even lighter than before, the alternator minimises the free mass weight of the entire crankdrive system running in anti-friction bearings, giving the single-cylinder even more spontaneous and athletic performance. The balance shaft serving to optimise smoothness and running refinement has been retained, with the new starter and alternator cover made of magnesium making a significant contribution to the lower weight of the engine. The redesigned four-valve cylinder head, finally, serves mainly to connect the power unit ideally to the frame and suspension as a load-bearing element.

Engine management is provided by BMW BMS-C II electronic engine control responsible not only for the concept of manifold injection, but also for the dual ignition system. Indeed, BMS-C II engine management even features model-specific control maps tailored to the various motorcycle concepts. And thanks to the all-new stainless-steel exhaust complete with its oxygen sensor and three-way catalytic converter now moved higher up than before, as well as the precise engine set-up, the short-stroke power unit significantly outperforms the EU 3 emission standard.

The proven valve drive system with its timing chain, two overhead camshafts and cup tappets, as well as the aluminium radiator cooling system, all remain unchanged. The gearbox likewise remains the same as before, while the final drive ratio on the chain sprocket has been modified, with a 15-tooth pinion and a 47-tooth sprocket on the G 650 Xchallenge providing a shorter ratio than on the other two G 650 X models with their longer 16:47 ratio. The different roll circumference on the rear tyres, finally, also affects each model's riding dynamics.

Yet another new feature is the dry sump oil tank to the left behind the cylinder, contributing to the perfect concentration of masses around the motorcycle's centre of gravity and thus promoting the unique handling of each model to an even higher standard.

Ease of maintenance with service intervals of 10,000 kilometres or 6,000 miles unusually long in this segment remains at the same high level as before.

### **Highly stable lightweight frame made of steel and aluminium.**

The particularly light frame is the same on all three models in the G 650 X series and is made up of four highly stable modules: The welded main frame made of steel profile sections, aluminium castings bolted on to the main frame around the swing arm mounting point, the aluminium lower section holding the engine in position, the forged aluminium auxiliary frame serving to take up spring strut forces, and the aluminium frame bolted on at the rear.

With its appropriate use of materials specifically chosen at each point and tailored precisely to load requirements, this concept makes a significant contribution to the minimisation of overall weight – which is precisely why the various models weigh a mere 156 kg/344 lb (Xchallenge, the lightest model) to 160 kg/353 lb (Xcountry, the heaviest model) with a full tank according to the DIN standard.

The intelligent mix of materials on the frame offers a number of other benefits: The aluminium castings around the swing arm mounting point the rider is bound to touch with his boots are eloxy-plated to prevent any such contact from leaving behind unwanted marks. At the same time the swing arm mounting point has been modified in its configuration, the swing arm now pivoting exclusively on the main frame and not on the engine block, and being positioned relatively close to the pinion. This not only serves to provide even faster drivetrain response, but also reduces the tolerance (less slackness) of the drive chain.

### **Light rear frame and lower section made of aluminium.**

The rear frame is bolted on to the main frame, allowing easy and low-cost replacement in the event of damage. To make the rear frame resistant to even the highest loads, high-strength aluminium forgings are welded into the ends of the eloxy-plated aluminium frame tubes bolted on to the main frame. The lower frame section holding the power unit at the front boasts the same very special lightweight technology.

### **Double swing arm made of cast light alloy.**

The extremely stable, double aluminium swing arm also comes with top-quality eloxy-plated surface finish. Made of cast aluminium, the double swing arm is heat-treated in the production process in the interest of even greater strength and stability provided by the more consistent grain structure of the material.

Wheel guidance on all models in the BMW G 650 X range is provided by a spring strut pivoting at the top on a forged aluminium mount. This ensures smooth and consistent distribution and flow of forces, since the forged aluminium support rests itself on two points – first, on the side sections of the frame, and second, on the cylinder head itself through a bolted connection and, in the immediate vicinity, on the stable connection linking the cylinder head and the frame of the motorcycle.

### **Upside-down telescopic fork with different spring travel on each model.**

The upside-down telescopic fork (USD fork) is one of the suspension components identical on all three models in the new BMW G 650 X model range. The different character of each model is borne out by different spring travel, a different set-up, and differences in design and configuration around the wheel mounting point. A further feature on the Xmoto and Xchallenge is adjustment of the telescopic fork both inbound and outbound.

With tube diameter of 45 millimetres or 1.77", forged aluminium fork bridges, and wheel axle diameter of 20 millimetres or 0.79", the telescopic fork is extremely strong and torsionally resistant, ensuring supreme directional stability at all times.

**Tank fitted in the frame triangle for optimum weight distribution and concentration of masses.**

The position of the fuel tank in the frame triangle beneath the seat, a concept already proven on the F 650 GS, has been carried over to all three single-cylinder models on account of its obvious benefits, with optimum concentration of masses near the motorcycle's low centre of gravity.

Made of a special plastic material, the fuel tank has a capacity of 9.5 litres or 2.1 imp gals and is filled from the right through the lockable tank filler pipe. Even though this fuel capacity may appear to be relatively small at first sight, it is sufficient for a cruising range of up to 250 kilometres or 155 miles, since the single-cylinder power unit is very fuel-efficient.

**Light and modern two-channel ABS – quite unique in this segment.**

As an option, the G 650 X models are available straight from the plant with new two-channel ABS from Bosch, the latest generation of BMW Motorrad ABS already featured on the F 800 S/ST and the R 1200 S. The particular advantages of this anti-lock brake system are not only compact dimensions and low weight of just 1.5 kg or 3.3 lb, but also a high standard of precision and quality in controlling the brakes: The pressure modulator masterminds optimum brake pressure in the ABS mode via intake valves with linear control, keeping the control intervals very fast and precise. And a further advantage of the modern valves with their infinitely variable cross-sections is that the rider feels only a very weak pulse effect in the brake levers.

Enhanced diagnostic functions round off the benefits offered by this modern and sophisticated ABS control system. The wheel speed sensors, for example, automatically monitor their distance from the sensor wheel and thus contribute to the supreme standard of safety offered by the system. To ensure an optimum and consistent pressure point at all times, the brake system comes with steel-reinforced brake lines even on models not fitted with ABS.

A further point is that the rider is able to deactivate the ABS anti-lock brake system when riding offroad under particularly sporting conditions or when enjoying his machine on a closed circuit. And last but not least, all models fitted with ABS come complete with a 12-V power socket.

### **Features and equipment – giving great attention to each and every detail.**

The lightweight concept is also maintained consistently with all the motorcycle's attachments and auxiliary units revealing great attention to detail: The footbrake and gearshift levers are made of light, forged and therefore highly stable aluminium. The gearshift lever comes complete with a spring-loaded, folding boom at the side, the footbrake lever, through its rolled mounting, allows particularly sensitive operation of the rear wheel brake of particular significance on the Street Moto.

The side-stands on the Xchallenge and Xmoto are made of forged aluminium, the numberplate supports and direction indicators can be easily removed for sports riding on a closed circuit. And again last but certainly not least, wide, zig-zagged footrests ensure safe support and stability.

The high-strength light-alloy tubular handlebar comes in conical design for maximum surface contact at all fastening points despite minimum weight. The handlebar supports varying in height on all three models are mounted on rubber holders in the forged fork bridges as a solution efficiently absorbing any unpleasant vibration without reducing the direct feel of the handlebar so important to the demanding rider.

The cockpit is intentionally purist in design and configuration, with clear and easy-to-read instruments informing the rider at all times of his speed, the time of day, and the distance he has covered. Two trip counters may be activated at the touch of a button, and the cockpit also presents a battery charge reading. In the interest of enhanced flexibility, the instruments may be converted by an authorised workshop to either miles or kilometres, whatever the rider requires.

The rear lights come in cutting-edge LED technology ensuring a rapid response, above-average service life, a high degree of light intensity, and power consumption kept to a minimum. The direction indicators come as standard with white lenses.

Reflecting the technology usual in this class, electrical energy supply and the cables in the electrical system retain their conventional technical features. The battery is readily accessible behind the handlebar unit to the right beneath the fairing.

All models in the G 650 X series are registered for riding with a passenger. The passenger kits available as special equipment on the G 650 Xchallenge and G 650 Xmoto are made up of special handles and high-quality, forged footrest supports. And a final advantage is that converting the machines for riding with a passenger does not require an entry in the motorcycle's homologation documents.

## 2.2 Specific Model Components and Distinctions.

In conjunction with the light but stable frame and the high-quality suspension components, the powerful and refined engine sets the foundation for superior performance, exceptional handling, and very good tracking directional stability all the way to top speed.

While all three models naturally share these fundamental qualities at the same very high level, they differ from one another in terms of their character and riding features through various design elements and items of equipment, as well as their different suspension geometry and set-up. Apart from the handlebar mounts, the seat, headlights and various design features, particularly the wheels and tyres differ from one another, as well as the brakes and rear spring struts.

Differences in suspension geometry are ensured by the spring travel, the size of the various wheels, as well as modified mounting points for the front wheel. And last but certainly not least in this context, the final drive ratio is specifically tailored to the purpose and character of each individual model.

### **BMW G 650 Xchallenge – the Hard Enduro for the offroad enthusiast.**

The BMW G 650 Xchallenge proves at very first sight that it has a lot to offer: This is an uncompromising offroad machine with long spring travel and not one single gram of extra weight. In its design, the BMW G 650 Xchallenge is dominated by proportions typical of a genuine Enduro – a high-lying, but smooth and flat flyline merging directly into the high and slender rear end to offer the rider the ideal seating position. Made of fracture-proof and elastic plastic (mainly polypropylene), the fairing components both light and robust are likewise ideal for tough offroad requirements. The front wheel cover is fitted directly to the lower fork bridge, giving the front wheel superior smoothness and running freedom under all conditions. The slender fairing, in turn, gracefully takes up the asymmetrically contoured headlight featuring a reflector in free-form design. Positioned off-centre, the parking light, finally, helps to provide that typical look of BMW Motorrad further enhanced by paintwork in Aura White and the Blue seat.

Benefiting from 270 millimetres or 10.63" spring travel both front and rear, BMW Motorrad's new Hard Enduro will easily take on any challenge off the beaten track. Tube diameter of 45 millimetres or 1.77", in turn, gives the upside-down telefork enormous overall stiffness, allowing a handlebar lock of 40°.

The springs and dampers are all specially tuned for offroad use, meeting the highest demands in every respect. As a function of his own weight and personal preferences, the truly ambitious Enduro rider is even able to fine-tune the dampers on their inbound and rebound strokes, the adjustment mechanisms offering predetermined rest points for smooth, consistent adjustment.

Again in the interest of minimum weight, the wheel axle measuring 20 millimetres or 0.79" in diameter is drilled hollow on both the front and rear wheel. The rear wheel suspension also allows various adjustments and set-ups, albeit of a very different character: Like the BMW HP2 Enduro, the BMW G 650 Xchallenge features the BMW Motorrad Air Damping System, a special spring/damper system operating exclusively with air. In its configuration and functions, the Air Damping System is the same as on the HP2 Enduro and has merely been adjusted in terms of weight and its running requirements.

The BMW Motorrad Air Damping System comes with a piston inside, similar to the configuration in conventional spring struts. Instead of hydraulic fluid, however, this system forces out air through plate valves into a second chamber, the damping effect being achieved by throttling the flow of air.

Since gas is compressible, the air within the system can act as a kind of spring replacing the usual steel spring and thus offering the advantages already lauded on the BMW HP 2 Enduro:

- "Natural" progression of spring rates under high load (with growing pressure within the system).
- Reliable and smooth operation minimising the risk of the suspension giving way (physical law of gases: pressure increases as a function of temperature).
- "Natural" progression of the damping effect under high loads (the viscosity of air increases as a function of temperature).
- Frequency-dependent, selective damping effect.
- Resistant to overheating (no temperature-induced weakening of the damping effect under high loads).
- Simple option to adjust the dampers to the load carried.
- Low weight of the entire system and its components.
- Individual adjustment and set-up of the suspension matched to the rider's weight and the load carried by means of a water level presenting the normal position and trim of the motorcycle.

The reduction in unsprung masses also improves spring response and traction on the rear wheel. To the outside, the spring strut is sealed hermetically and is therefore protected from contamination, with any losses caused by leakage being set off by filling in air through a valve.

The system adjusts very easily and conveniently to different load conditions simply by varying the pressure filling. And to pump up the system while travelling, the rider has the option to use a hand-operated high-pressure pump fitted beneath the seat of the G 650 Xchallenge.

A feature unique to this air spring damper system is the choice of frequency-related damping achieved by varying the inner flow system together with the throttle openings. And an important effect achieved in this way is much better traction of the rear wheel on bumpy, undulating surfaces: The damping effect can be appropriately adjusted in the frequency ranges typically encountered on the rear wheel swing arm as a result of bumpy surfaces, the wheel thus following any such bumps in an ideal motion, maintaining optimum ground contact at all times. The result is even better grip and traction when accelerating all-out, as well as extra safety when applying the brakes.

Any risk of the springs sagging and giving way, as is often the case on long, undulating surfaces and under high loads, is largely excluded by "natural" adjustment of the spring rates in the air springs together with the frequency-specific damping effect: An adjustment bolt opening up a bypass in the damper enables the rider to pre-set the damper characteristics to two stages for either more comfortable riding on regular roads or for a firmer set-up on offroad terrain.

It almost goes without saying that the wheels and tyres also meet the typical requirements of offroad riding. Due to their better elasticity, spoke wheels come as standard on the BMW G 650 Xchallenge, offering all the features of lightweight technology. The wheel hubs made of aluminium are hollow-cast and are connected to the epoxy-plated aluminium rims by extra-strong wire spokes.

To build up sufficient stabilising gyro-forces also on difficult and slow trails, the G 650 Xchallenge comes with a front wheel measuring 21 inches in diameter and running as standard on a 90/90-21 tyre, while at the rear an 18-inch wheel running as standard on a 140/80-18 tyre allows the use of specialised offroad tyres whenever required.

Measuring a significant 300 millimetres or 11.81" in diameter at the front and 240 millimetres or 9.45" in diameter at the rear, the brake discs – and indeed, the entire brake system – are conceived without compromises for handling high loads. Apart from saving weight, the cross-drilled Wave brake discs on the G 650 Xchallenge have a better self-cleaning effect than conventional discs. And while the front wheel disc runs within a double-piston floating-calliper configuration, the rear disc is held tight when required by a single-piston floating calliper.

With its 15-tooth pinion and a 47-tooth sprocket, the G 650 Xchallenge has a shorter final drive ratio than the other two models in the new G 650 X model range.

### **BMW G 650 Xmoto – enjoying fast bends on the road.**

Even at a standstill, the Street Moto clearly proves that this very special machine focuses on one highlight in particular: sheer riding pleasure on country roads. Small 17-inch wheels, the aluminium handlebar fastened in position by extra-short mounting clamps, the front wheel cover complete with its colour-highlighted tube protectors fitted close to the tyre, as well as the headlight fairing finished in twin-tone Graphitane metallic matt and Red clearly change the proportions of this special model, giving the G 650 Xmoto an even more muscular and athletic look, even though many of the fairing components as well as the asymmetrically designed headlight are the same as on the Hard Enduro.

The Street Moto nevertheless stands out significantly from its "sister models" in terms of its suspension set-up, with the smaller cast-aluminium 17-inch wheels running on sports tyres with very good grip ensuring optimised handling in every respect. Measuring 120/70 at the front and 160/60 at the rear, the tyres reflect the muscular look and character of the machine, allowing use of the latest sports tyres on the rims measuring 3.5 and, respectively, 4.5 inches in width.

Apart from lower gyro-forces on the front wheel, the shorter camber also enhances the motorcycle's handling and agility on the road.

The forward-leaning seating position also helps to make long and winding bends as well as serpentines a truly outstanding pleasure on two wheels, optimum directional stability on straight passages in between again leaving nothing to be desired.

One of the improvements made to optimise the motorcycle's suspension geometry is the opening for the front axle moved further back, again in the interest of almost playful but nevertheless safe handling for significant benefits also in city traffic.

Both the springs and dampers are specifically tailored to the Street Moto with its particular requirements and riding qualities. While the upside-down telescopic fork offers 270 millimetres or 10.6" spring travel like on the Hard Enduro, the fork is even firmer and tauter all round in its inbound and rebound motion. Particularly the sporting rider will be happy to enjoy the sensitive, incremental adjustment of the damper in both directions, ensuring an individual, personalised set-up at all times.

Rear-wheel suspension, in turn, is firmer and shorter, with spring travel at the rear of 245 millimetres or 9.65".

The Street Moto boasts the most powerful brake system of all models in the G 650 X line-up: At the front a four-piston fixed calliper interacts with a 320-millimetre (12.60") brake disc in floating arrangement, interacting with high-grip radial tyres for exceptional deceleration benefiting in particular from the very high torsional stability of the USD telescopic fork with its main tubes measuring 45 millimetres or 1.77" in diameter.

With its 240-millimetre (9.45") brake disc and floating-calliper configuration, the rear-wheel brake is the same as on the other two models.

Final drive on the G 650 X Moto conceived for road use comes with a ratio of 16 : 47 teeth, that is somewhat "longer" than on the Enduro version.

### **BMW G 650 Xcountry – a modern interpretation of the scrambler.**

Back in the '50s and '60s of the last century, road-going motorcycles also suitable for offroad use after making a few technical modifications were called "scramblers". And today the BMW G 650 Xcountry offers the same versatility, bringing together the best of two worlds: excellent road-going qualities combined with offroad assets typical of an Enduro.

In terms of both looks and technical features, the G 650 Xcountry stands out quite clearly from its two sister models: Featuring a smooth-lens round headlight, a "naked" cockpit without fairing, a two-level seat and the front mudguard running close to the wheel and held in position by a stable tubular bracket, the G 650 Xcountry alludes clearly and intentionally to the classic scrambler. Indeed, this particular look is further enhanced by the high-rising exhaust system as well as twin-tone paintwork in Deep Black and White Aluminium matt metallic.

The G 650 Xcountry is also quite unique in technical terms, the telescopic fork still offering ample and relatively smooth wheel travel requiring a mere 240 millimetres or 9.45" overall travel to ensure exemplary riding comfort and appropriate offroad qualities. The rear gas-pressure spring strut, in turn,

comes with an adjustable inbound stroke and spring pre-tension allowing 210 millimetres or 8.27" spring travel. It also features convenient adjustment for length allowing variation of seat height from 840 to 870 millimetres (33.1 to 34.3"). In combination with the high-rising aluminium handlebar complete with vibration-damping weights, this ensures a particularly casual and relaxed seating position.

It almost goes without saying that a scrambler, by tradition alone, simply has to come on wire-spoke wheels. So this is precisely what the G 650 Xcountry has to offer, ensuring consistent lightweight technology all the way, with hollow-cast aluminium hubs and epoxy-plated rims also made of light alloy.

Typical of a scrambler, the 19-inch front wheel, as well as the 17-inch wheel at the rear, both roll on hollow-drilled wheel shafts. And last but not least, tyres with their own special tread and dimensions of 100/90 at the front and 130/80 at the rear, again live up to all the versatile and individual requirements made of a scrambler.

Superior stopping power is provided also on the G 650 Xcountry by brake discs measuring 300 millimetres or 11.81" in diameter at the front and 240 millimetres (9.45") in diameter at the rear. The brake callipers are floating units with double-piston actuators at the front.

Featuring a 16-tooth pinion and a 47-tooth sprocket, finally, the final drive ratio is exactly the same as on the Street Moto.

## 2.3 Range of Equipment.

### **Optional extras and special equipment.**

Tailored to the specific features and requirements of each model in the G 650 X range, the special equipment offered by BMW Motorrad can be fitted ideally on the spot by the customer's motorcycle dealer. The only optional extra offered straight from the factory is BMW Motorrad ABS always fitted together with a 12-volt power socket.

### **Special equipment.**

- 25 kW (34-hp) retrofit kit (scheduled for 2007).
- Offroad headlight protector (for the G 650 Xchallenge only).
- Aluminium cover for the rear brake fluid reservoir.
- Aluminium pinion cover.
- Aluminium sprocket protector.
- Aluminium frame protector.
- Handlebar impact protector.
- Hand protector bars.
- Set of protectors for the hand protector bars (large).
- Set of protectors for the hand protector bars (small).
- Set of add-on spoilers for hand protectors (large).
- Small engine protection hoop.
- Aluminium underfloor protector (standard on the G 650 Xchallenge).
- Plastic underfloor protector (standard on the G 650 Xcountry).
- Set of fall pads (G 650 Xmoto only).
- Windshield holder (G 650 Xcountry only).
- Low seat (G 650 Xchallenge and Xmoto only).
- Windshield (G 650 Xcountry only).
- Luggage rack.
- Rear bag (G 650 Xchallenge and moto only).
- Tank bag (G 650 Xcountry only).
- Passenger kit G 650 for Xchallenge and moto (footrests and grab handles).
- 12-volt power socket.
- Titanium sports silencer (fully homologated).
- Titanium exhaust manifold.
- Carbon-fibre exhaust system covers.
- Service toolkit.
- Support for navigation unit.
- Topcase with baseplate (in preparation, G 650 Xcountry only).
- Adapter plate for topcase (in preparation, G 650 Xcountry only).
- Inner bag for topcase (in preparation).

### **Rear bag for short rides.**

Both the BMW G 650 Xchallenge and the G 650 Xmoto are available with a special, extra-robust rear bag complete with a rubber-finished zipper bolting on to the optional luggage rack and offering ample space for day trips well-protected from splashwater. The bolted connection keeps the bag firmly on the motorcycle also when riding fast and dynamically on rough terrain, velcro straps inside helping to keep individual items such as the rider's service toolkit firmly and safely in position.

### **Watertight tankbag.**

The tankbag for the BMW G 650 Xcountry is fastened behind the handlebar centrepont and is tailored precisely to the front fairing components, offering generous space and a map folder up to DIN A4 in size – both in watertight, high-quality finish. The elaborately embroidered model designation on the bag as well as the removable shoulder carrier straps are two further attractive details.

### **Topcase with adapter plate and inner bag (in preparation).**

The 31-litre (1.09 cu ft) topcase available for the BMW G 650 Xcountry is the same as the topcase on the F 650 GS. A special adapter plate keeps the topcase safely and firmly on the luggage rack for accessories, a grab handle as well as a secure lock on the lid naturally come as standard. A watertight inner bag, finally, is available as a separate feature.

### **Windshield for the BMW G 650 Xcountry.**

Apart from looking really attractive, the small optional windshield offers additional protection from wind and weather.

### **Additional headlight protector for the BMW G 650 Xchallenge.**

Made of impact-resistant polycarbonate, the headlight protector offers effective protection from stone-throw particularly on rough terrain. Through its design and configuration alone, it is a perfect match for BMW's Hard Enduro.

### **Small engine protection hoops.**

Finished in black, the robust engine protection hoops offer additional protection from damage in both everyday riding and under tough offroad conditions.

### **Underfloor protector in various sizes.**

Made of robust, deep-drawn aluminium, the underfloor protector comes as standard on the BMW G 650 Xchallenge and may be retrofitted on the two other models.

The BMW G 650 Xcountry is fitted as standard with a small underfloor protector made of impact-proof plastic also available as an accessory and easy to fit on the BMW G 650 Xmoto.

### **Hand protection bars complete with protector and spoiler.**

Configured as a modular system, the hand protector made up of an enclosed stainless steel bar and various attachments made of impact-proof, completely coloured plastic is able to offer various protective functions. The hand protector bar helps to avoid damage to the handlebar and instruments, the protector element available in two sizes reliably protecting the rider's hands from stone-throw, while the spoiler offers additional protection from cold and wet weather.

### **Handlebar impact protector.**

Carried over from enduro sport, the protector made of extra-strong foam is fitted on the handlebar mount and offers additional safety and protection for the rider.

### **Crash pads for the BMW G 650 Xmoto.**

Crash pads on the Street Moto help to avoid major damage in minor incidents. They are fitted in pairs on the two axles and the rider's footrests.

### **Titanium sports muffler with full homologation.**

Made by Akrapovic, the sports muffler fits perfectly on to the original exhaust manifold of the G 650 X models. Conical in shape, this tailpipe made of carbon-fibre-reinforced plastic adds extra sporting flair and character to the machine. The muffler unit itself may be removed for sports riding on private tracks and circuits. Together with the titanium manifold described below, the titanium sports muffler helps to reduce weight by approximately 2.8 kg or 6.2 lb.

### **Titanium exhaust manifold.**

The extremely light but highly resistant material used for the exhaust manifold takes on its characteristic colour on account of the hot exhaust gas and is acknowledged by the connoisseur as a particularly sophisticated component.

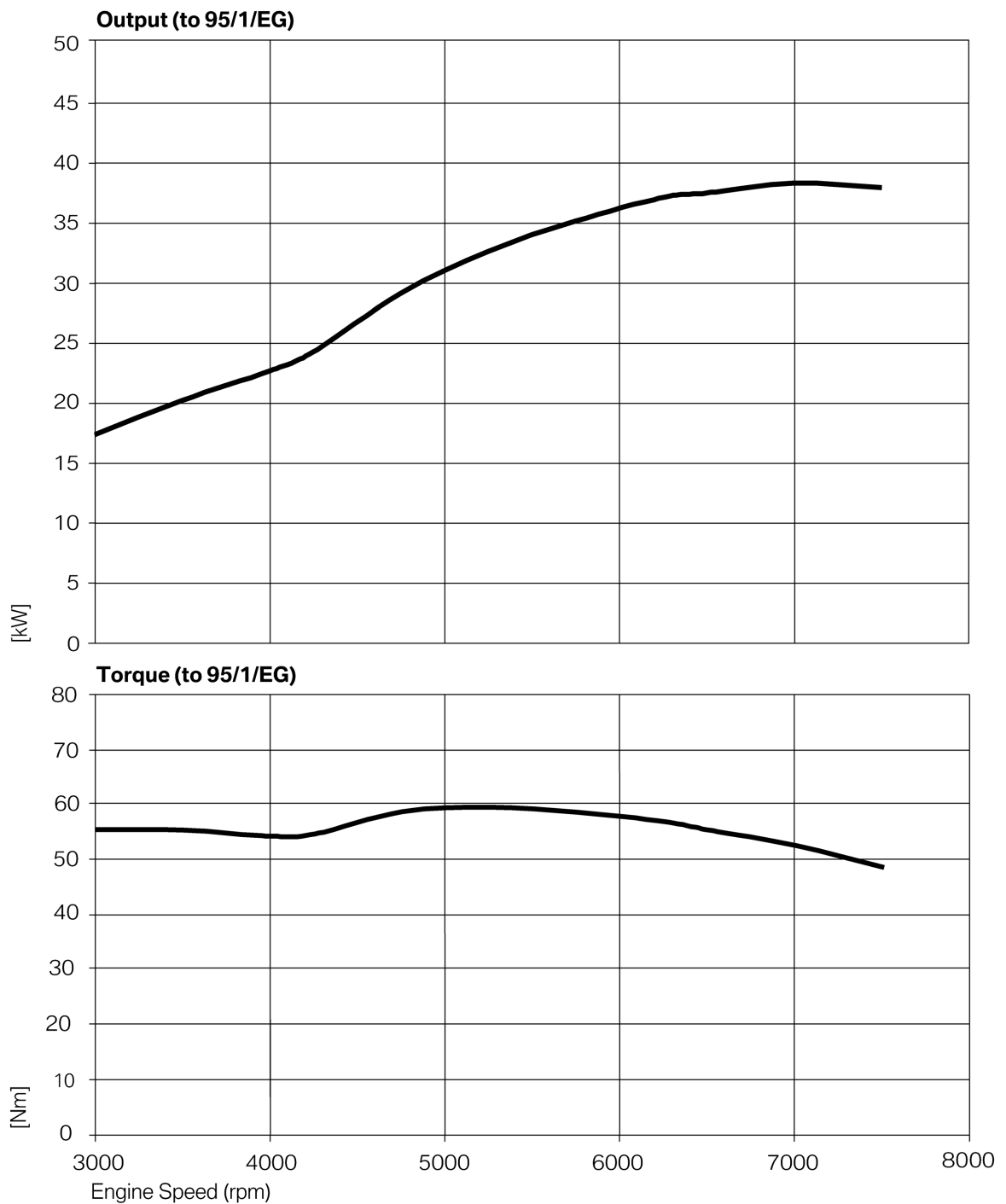
### **Carbon-fibre trim panels on the exhaust system.**

Carbon-fibre trim panels replacing the regular heat protection panels on the exhaust manifold, silencer connection and muffler body offer particularly sporting and dynamic flair.

### **High-quality aluminium trim panels.**

A number of accessories are made of top-quality light alloy, replacing the plastic parts otherwise used as standard. Two examples are the chain protection and pinion covers. The beautifully designed frame protector, in turn, protects the surface of the frame under extreme offroad riding conditions from marks and scratches possibly caused by the rider with his offroad boots and at the same time protects the rear master brake cylinder.

## 2.4 Engine Output and Torque.



# Specifications. G 650.

		Xchallenge	Xcountry	Xmoto
Engine		Liquid-cooled single-cylinder four-stroke power unit with dual ignition		
Capacity	cc			652
Bore/stroke	mm			100/83
Max output	kW/hp			39/53
at	rpm			7,000
Max torque	Nm/lb-ft			60/44
at	rpm			5,250
Compression ratio/fuel grade		11.5 : 1/unleaded premium (RON 95)		
Valve/gas charge management		DOHC (double overhead camshaft)		
Valves per cylinder/intake/outlet dia	mm			4/36/31
Fuel supply		Electronic manifold injection, BMS-C II		
Throttle butterfly diameter	mm			43
Exhaust management		Fully controlled three-way catalytic converter		
Electrical System				
Alternator	W			280
Battery	V/Ah			12/10, maintenance-free
Power Transmission/Gearbox				
Clutch		Multiple-plate clutch in oil bath		
Gearbox		Dog-shift five-speed gearbox		
Primary transmission ratio				1.946
Gear ratios	I			2.750
	II			1.750
	III			1.310
	IV			1.050
	V			0.840
Rear wheel drive				Chain
Final drive		3.133	2.937	2.937
Suspension and Running Gear				
Frame		Steel bridge tubular frame with bolted cast aluminium components and aluminium rear frame		
Suspension, front		USD telescopic fork, tube dia 45 mm		
Suspension, rear		Aluminium two-unit cast swing arm		
Spring strut		Air Damping System	Gas-pressure spring strut	
Spring travel, front/rear	mm	270/270	240/210	270/245
Castor	mm	118	116	98
Wheelbase	mm	1,500	1,498	1,500
Steering unit angle	°	62.5	61.5	61.5
Single-disc brake, front, disc dia	mm	Double-piston calliper, 1 x dia 300		Four-piston calliper, 1 x dia 320
Single-disc brake, rear, disc dia	mm	Single-piston floating calliper, dia 240		
Anti-lock brake system		BMW Motorrad ABS available as an option		
Wheels		Spoke wheels	Spoke wheels	Cast wheels
	front	1.60 x 21	2.50 x 19	3.50 x 17
	rear	2.50 x 18	3.00 x 17	4.50 x 17
Tyres	front	90/90-21	100/90-19	120/70-17
	rear	140/80-18	130/80-17	160/60-17
Weights and Dimensions				
Length, overall	mm	2,205	2,185	2,155
Width, overall, with mirrors	mm	907	907	907
Width, overall, without mirrors	mm	825	860	825
Seat height	mm	930	840–870	900
Ride height	mm			
Dry weight/DIN unladen weight	kg	144/156	148/160	147/159
Max permissible	kg			335
Tank capacity	ltr			9.5
Fuel Consumption and Performance				
Fuel consumption 90 km/h	ltr/100 km	3.6	3.4	3.5
Fuel consumption 120 km/h	ltr/100 km	5.1	4.8	5.0
Acceleration				
0–100 km/h	sec	4.01		4.03
Standing-start km	sec	22.57		22.58
Top speed, approx	km/h	165	170	170

## 2.6 Colours.

	<b>Colour</b>	<b>Seat</b>
G 650 Xchallenge	Aura White	Blue
G 650 Xmoto	Graphitane metallic matt/Red	Grey/Black
G 650 Xcountry	Deep Black/White Aluminium metallic	Black

### **3. The new BMW K 1200 R Sport.** **Short Version**



Presenting the new K 1200 R Sport at INTERMOT 2006, BMW Motorrad is proudly introducing the fourth model in the Company's most powerful model series. And as the model designation already indicates, the new K 1200 R Sport is based on the BMW K 1200 R.

Perhaps the most essential feature of the new K 1200 R Sport is the semi-fairing mounted firmly to the frame and bearing the same headlight as on the R 1200 S. Integrated harmoniously into the overall design of the motorcycle, the semi-fairing retains a clear and free view of the impressive engine and running gear technology. The fairing not only emphasises the sporting character of this Big Bike, but also enhances its wide range of riding opportunities and general use versus the K 1200 R.

Offering significantly improved wind protection particularly advantageous at high speeds, the new BMW K 1200 R Sport is even more suitable for covering long distances at high speeds. It is indeed the ideal motorcycle not only for dedicated riding pleasure on the race track, but also for all-out enjoyment on country roads and motorways, offering the rider the option to adopt a more upright seating position than on the even more sporting and dynamic K 1200 S.

As the sister model of the K 1200 R, the new K 1200 R Sport features the same drivetrain and suspension technology. With maximum output of 120 kW (163 hp), kerb weight of just 241 kg or 531 lb, and its innovative Duolever and Paralever suspension, the new model offers the highest standard of riding dynamics and performance at all times and under all conditions.

Over and above these outstanding features, the BMW K 1200 R Sport offers a wide range of talents intentionally not provided on the K 1200 R without a fairing. These include supreme versatility in all kinds of situations, enhanced riding comfort, and even better performance and handling at high speeds. And at the same time the new machine offers all the virtues typical of a Roadster, such as sharp and crisp handling, sporting performance, and a relaxed seating position.

The new BMW K 1200 R Sport addresses the ambitious sports rider with a penchant for progressive, "naked-bike" technology and a wide range of motorcycling options on a truly versatile machine. Offering an ample choice of

accessories carried over in most cases from the K 1200 R, the new K 1200 R Sport ensures optimum comfort and a truly outstanding riding experience particularly on long distances.

The technical highlights of the new K 1200 R Sport at a glance:

- Semi-fairing mounted firmly on the frame and a new headlight emphasising the sporting character of the K 1200 R Sport and improving its riding comfort particularly at high speeds.
- High-performance four-cylinder inline power unit tilted 55° to the front, maximum output 120 kW (163 hp), maximum torque 127 Nm (94 lb-ft).
- Fulfilment of the strictest environmental standards thanks to Digital Motor Electronics and three-way catalytic converter.
- High-performance aluminium suspension with Duolever wheel mount at the front and EVO-Paralever wheel mount at the rear.
- Unladen weight of only 241 kg or 531 lb in road trim, perfect balance ensured by a low centre of gravity, supreme handling qualities.
- Relaxed seating position for an active riding experience.
- Electronic immobiliser featured as standard.
- On-board network with CAN-bus technology.
- Electronically adjustable ESA suspension available as an option.
- Latest-generation Integral ABS (semi-integral version) available as an option.
- Tyre pressure control (TPC) as an option.
- Wide range of optional extras and sports accessories.
- New: BMW Motorrad High Performance Parts for sporting customisation.

## 3.1 Technical Features and Design.

As the latest model in the K-Series, the new BMW K 1200 R Sport boasts the same top-of-the-range technology as its sister models. Specific details of the drivetrain, suspension and running gear, brakes and on-board network are described in detail in the press kit on the K 1200 S and, respectively, K 1200 R.

### **Semi-fairing with integrated headlight mounted firmly on the frame.**

Developed in the wind tunnel, the front fairing made of plastic elements is perfectly matched to the motorcycle, combining good looks with equally good protection from wind and weather. Defined air guidance around the side spoilers guides the wind smoothly around the rider, reducing wind pressure on his head and upper body.

Despite its compact and slender dimensions, the fairing on the K 1200 R Sport offers significant safety and protection even at high speeds enhanced greatly over the standard offered on the Roadster with its large windshield. And apart from extra comfort, the engineers at BMW Motorrad have also succeeded in enhancing the motorcycle's dynamic potential, with the rider benefiting from excellent wind protection above all at high speeds.

The strikingly designed headlight in clear glass look and with free-form technology integrated in the fairing is the same as on the sporting R 1200 S, the asymmetric design of the headlight alone showing clearly that this is a genuine BMW. The reflectors are tailored geometrically to the rider's illumination requirements, interacting together with the H7 bulbs arranged next to one another to provide excellent light intensity and illumination on the road ahead.

Beneath the headlight, the fairing proudly boasts two typical BMW kidney grilles interacting with the wheel mounts and radiator trim panels also optimised in the wind tunnel to ensure an efficient flow of cooling air to the radiator.

The fairing components at the side are fastened to the motorcycle by integrated plastic mounts, avoiding the need to use visible bolts or screws and again emphasising the elegant, sophisticated look of the new BMW K 1200 R Sport.

### **High-performance four-cylinder inline power unit.**

The new K 1200 R Sport is driven by the same engine that ensures supreme riding pleasure on the BMW K 1200 R: Like on the Roadster, the high-performance power unit develops maximum output of 120 kW (163 hp) at 10,250 rpm, with peak torque of 127 Nm (94 lb-ft) at 8,250 rpm. These figures alone clearly underline the supreme acceleration and drive power of the K 1200 R Sport standing out as a sporting multi-talent in every respect.

Dry sump lubrication and the position of the compact power unit with its cylinder bank tilted 55° to the front ensure a very low centre of gravity offering, first, the desired load on the front wheel and, second, sporting, dynamic handling qualities at all times.

### **Six-speed gearbox.**

The six-speed gearbox on the K-Series is a light and compact integrated transmission unit fully contained within the engine housing. The gearbox itself as well as the gear increments are the same as on the other K-models.

### **Duolever front wheel suspension.**

Like its sister models, the new K 1200 R Sport boasts Duolever front suspension combining superior precision and directional accuracy with optimum suspension comfort. The entire structure is very strong and torsionally resistant, naturally being conceived and designed for light and smooth handling. And thanks to its smooth response, the front wheel suspension offers a precise feeling for the road surface, taking in and smoothly absorbing even the smallest bumps.

Yet another feature of the kinematic Duolever is its anti-dive brake action remaining virtually consistent throughout the motorcycle's entire spring travel.

All told, therefore, the new K 1200 R Sport offers an ideal combination of everyday riding qualities and sportiness also through its suspension and running gear, once again emphasising the dynamic character of the new machine from BMW Motorrad.

### **Paralever rear wheel suspension.**

Developed by BMW Motorrad for the K-Series, the Paralever is a highly stable lightweight construction efficiently combining the transmission of forces and rear wheel guidance, and connecting the spring strut via a progressive kinematic pivot point. It also offers significant benefits in damper response and progressive action.

Further advantages of the Paralever are the reduction of unsprung masses and load change reactions, the increase in ground clearance, and the particularly attractive, filigree look of the rear suspension.

### **Optional ESA and RDC.**

The new K 1200 R Sport is available as an option with BMW Motorrad's Electronic Suspension Adjustment (ESA) allowing the rider to adjust the spring/damper set-up conveniently to his particular requirements simply by pressing a button. And as a further option available straight from the factory, the new K 1200 R Sport also comes with TPC Tyre Pressure Control.

### **EVO brake system and Integral ABS as an option.**

The new K 1200 R Sport is fitted as standard with BMW Motorrad's proven EVO brake system also featured on other models in the K- and R-Series. With brake disc diameter of 320 millimetres/12.60" at the front and 265 millimetres/10.43" at the rear, this brake system is simply ideal for excellent stopping power also when riding fast and dynamically. And the flexible steel brake lines featured as standard on the EVO brake system not only look good, but also ensure a consistent pressure point at all times.

The new generation of BMW Motorrad Integral ABS with semi-integral function introduced in summer 2006 is available as an optional extra. This system controls the front and rear wheel brakes from the handbrake lever, while the footbrake lever acts exclusively on the brake at the rear as a configuration particularly well-suited for the sports-minded motorcycle rider.

### **CAN-bus technology and electronic immobiliser.**

A standard feature of the current BMW Motorrad K-Series is that the electrical and electronic components communicate with one another via a modern databus network exchanging digital information through one single wire. Introduction of this single-wire system has dramatically streamlined the on-board electrics, significantly reducing the need for cables and connectors as well as the weight of the entire wiring system.

A further point is that only this technology is able to provide reliable, comprehensive and rapid troubleshooting and diagnostic functions.

Yet a further benefit of CAN-bus technology is that it enables the service technician to read out data and/or re-define parameters. And an electronic immobiliser with direct exchange of data between the ignition key and the motorcycle's electronic system is also standard on the new K 1200 R Sport.

### **Design and colour concept.**

As a special variant of the K 1200 R optimised for streamlining and enhanced protection from wind and weather, the K 1200 R Sport comes with the same overall design characteristics as its “sister” model. The optical focus of the new machine is however on the dynamically enhanced frontal area, although the free, unrestricted view of the motorcycle’s technical components and key aesthetic elements again retain the full impression of innovative engine and suspension technology as striking BMW qualities. A further point is the semi-fairing offering a new, even more sporting look and making the K 1200 R Sport a truly unique model within the BMW Motorrad K-Series.

The new K 1200 R Sport is available in two colour variants interpreting the character of this semi-fairing Roadster in a different way each time.

White-Aluminium metallic matt is a special metallic paintwork combining a truly “technical” look with supreme clarity. The matt surfaces hardly generate any reflections, thus emphasising the specific lines and contours of the motorcycle through the interaction of light and shade alone. The engine and chassis components finished in black, in turn, create a clear and distinctive contrast giving the overall machine a particularly masculine and straightforward look.

Cosmic Blue, the second, truly powerful colour option, places greater emphasis on the motorcycle’s sporting flair. This colour highlights the dynamic lines of the machine and accentuates the semi-fairing in an even more impressive manner, the engine and suspension components finished in Silver rounding off the overall impression of the new K 1200 R Sport finished in Cosmic Blue.

## 3.2 Range of Equipment.

### **Optional extras and special equipment.**

BMW Motorrad offers a wide range of special equipment on the K 1200 R Sport mainly carried over from the K 1200 R. And while the optional extras are fitted straight at the factory, special equipment may also be retrofitted on the spot by the BMW Motorcycle Dealer.

### **Optional extras.**

- Heated handles.
- BMW Motorrad Integral ABS (semi-integral).
- Electronic Suspension Adjustment (ESA).
- TPC Tyre Pressure Control.
- Anti-theft warning system.
- Low seat (790 mm/31.1")\*.
- Sports wheels with 190-format rear tyre.
- Luggage rack\*.
- White direction indicators (LED indicators available from 2/07)\*.

Items marked with an \* are available also as special equipment from BMW Motorcycle Dealers.

### **Special equipment.**

- Tinted windshield.
- Supports for sports cases.
- Sports cases variable in capacity.
- Luggage rack\*.
- White direction indicators (LED indicators available from 2/07)\*.
- Sports softbag, small.
- Tankbag.
- Main stand.
- BMW Motorrad Navigator.
- Support for BMW Motorrad Navigator.
- Low seat (790 mm/31.1")\*.
- New: Sports silencer.

Items marked with an \* are also available straight from the factory.

### **New: BMW Motorrad High Performance Parts.**

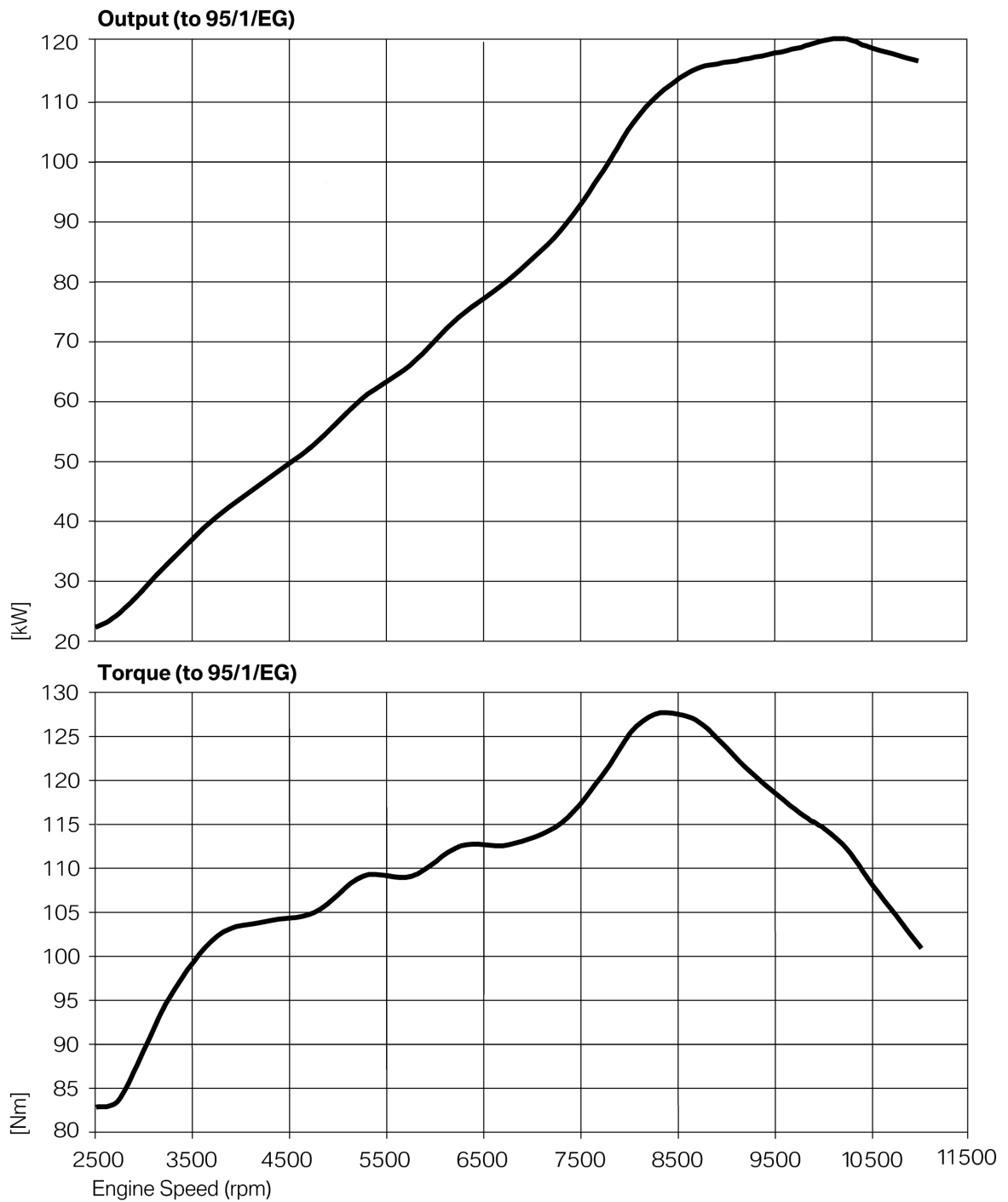
Introducing the K 1200 R Sport, BMW Motorrad is launching a new initiative in the accessories market tailored specifically to the brand's most sporting models: BMW Motorrad High Performance Parts give the customer the opportunity to customise his machine in particularly sporting style. And at the same time all of these new products offer the highest standard of good looks, function and quality.

The range of BMW Motorrad High Performance Parts is being consistently enlarged and will be carried over to other models in future. For details please see the separate press kit.

### **High Performance Parts for the K 1200 R Sport (extract).**

- HP footrests.
- HP carbon seat cover.
- HP carbon wheel cover, front.
- HP carbon engine spoiler.
- HP carbon clutch cover.

## 3.3 Engine Output and Torque.



# Specifications. K 1200 R Sport.

K 1200 R Sport		
<b>Engine</b>		
Capacity	cc	1,157
Bore/stroke	mm	79/59
Max output	kW/hp	120/163
at	rpm	10,250
Max torque	Nm/lb-ft	127/94
at	rpm	8,250
Configuration		Inline
No of cylinders		4
Compression ratio/fuel grade		13 : 1/premium plus (98 RON)
Valve/gas charge management		DOHC (double overhead camshaft)
Valve per cylinder		4
Valve dia, intake/outlet	mm	32/27.5
Throttle butterfly diameter	mm	46
Fuel supply		BMSK
<b>Electrical System</b>		
Alternator	W	580
Battery	VI/Ah	12/14 maintenance-free
Headlight	W	Low beam 1x H 7/55 W High beam 1x H 7/55 W
Starter	kW	0.7
<b>Power Transmission/Gearbox</b>		
Clutch		Multiple-plate oil bath clutch, dia 151 mm
Gearbox		Dog-shift six-speed gearbox
Primary transmission ratio		1.559
Gear ratios	I	2.398
	II	1.871
	III	1.525
	IV	1.296
	V	1.143
	VI	1.015
Rear wheel drive		Driveshaft
Final drive		2.91
<b>Suspension</b>		
Frame		Composite aluminium frame with internal moulding/extrusion pressed profiles and die-castings
Suspension, front		BMW Duolever
Suspension, rear		BMW Paralever
Spring travel, front/rear	mm	115/135
Castor	mm	101
Wheelbase	mm	1,571
Steering unit angle	°	61
Brakes	front	Double-disc brake, dia 320 mm
	rear	Single-disc brake, dia 265 mm
		BMW Motorrad Integral ABS (semi-integral) available as an option
Wheels		Light-alloy cast wheels
	front	3.50 x 17 MTH 2
	rear	5.50 x 17 MTH 2 (optional: 6.00 x 17 MTH 2)
Tyres	front	120/70 ZR 17
	rear	180/55 ZR 17 (190/50 ZR 17)
<b>Weights and Dimensions</b>		
Length, overall	mm	2,228
Width, overall, with mirrors	mm	856
Handlebar width, without mirrors	mm	785
Seat height	mm	820 (790)
Weight, unladen, with full tank	kg	241
Max permissible	kg	450
Tank capacity	ltr	19
<b>Performance and Fuel Consumption</b>		
Fuel consumption		
90 km/h	ltr/100 km	4.7
120 km/h	ltr/100 km	5.5
Acceleration		
0-100 km/h	sec	2.9
Standing-start km	sec	-
Top speed, approx	km/h	200 plus

# 3.5 Colours.

	<b>Colour</b>	<b>Seat</b>
K 1200 R Sport	White Aluminium metallic matt	Black
	Cosmic Blue	Black



## 4. Integral ABS and ASC – new Riding Dynamic Control Systems for BMW Motorcycles.

Entering its next generation, BMW Motorrad Integral ABS is taking a quantum leap in the process of evolution, advancing from a stand-alone solution acting only on the brakes into a fully networked all-round system. Offering the new generation of Integral ABS, BMW Motorrad provides the foundation for additional dynamic riding control systems with a reduction in technical requirements and features. And following the customer's wishes, this new generation also opens up the option in future for further-reaching rider assistance functions.

The first step in this direction is BMW Motorrad ASC Automatic Stability Control available as of 2007. This system serving to control drive spin on a production motorcycles is being introduced as an optional extra on the touring models in the BMW K and Boxer Series.

Once again, therefore, BMW is acting as the pioneer in the introduction of advanced safety technologies on the motorcycle. This further enhances the leadership which BMW Motorrad has shown in the area of active safety for more than 15 years.

Choosing the right development partner for both systems, BMW Motorrad obviously had to focus on that partner's specific competence in control technology and the networking of functions within the vehicle. In recent years, major car suppliers have become aware of the technical challenges presented by the motorcycle with its specific riding dynamics and the growing potential for motorcycle control systems in the market. The decisive point in pre-selection of the development partner was the willingness and ability to develop specialised solutions suitable for use on BMW motorcycles. So taking this into account, joint development of the new generation of ABS brake technology started together with Continental-Teves in early 2003.

### **Integral ABS.**

BMW Motorrad's new Integral ABS technology has been developed separately from the previous system and the entire layout of the system has been newly conceived from the ground up. Capitalising on progress in technology in both hydraulics and electronics, the development engineers have succeeded in simplifying the architecture of the system while at the same time enhancing its functions to an even higher standard. The result is supreme stopping power and very short stopping distances even without electrical power assistance on the brakes.

BMW Motorrad's new Integral ABS is no longer based on the plunger principle or, respectively, the ram pressure process used on previous generations, but instead is conceived as a valve system. Carried over from automotive applications, this control concept is now able to ensure a very high standard of all-round comfort and convenience in every respect. In particular, feedback of brake pressure modulation on the brake lever has been reduced by recent development of the control valves and management to such an extent that it no longer has any kind of adverse effect, thus paving the way for introduction of the new system also in the topmost segment of BMW motorcycles.

The new Integral ABS system applies brake pressure on the front wheel brake solely by means of a hydraulic circuit, thus acting entirely in response to the operating forces applied on the hand lever. This, in turn, ensures a more direct feeling of the brakes particularly important to the sports-minded rider. And now the rider no longer has to get used to any change in control or operation of the brakes when switching over from a motorcycle without ABS.

The new system naturally maintains the proven semi-integral function, that is automatic activation of the rear-wheel brake when operating the front-wheel brake. Pressing the footbrake alone, however, the rider, as in the case of a conventional system, activates only the wheel brake at the rear.

As with the previous system, the advantages of this integral brake are ideal brake force distribution on both wheels under all conditions, naturally taking load conditions into account, as well as enhanced control enabling the rider to detect at an early point the risk of the rear wheel lifting off when applying the brakes all-out, and to take appropriate counter-action.

To provide the desired integral function, brake pressure for the rear-wheel circuit is generated and built up by an electronically controlled hydraulic pump. This offers the advantage of pressure management and control completely independent of the front wheel circuit – which is the prerequisite for dynamic, adaptive and, ultimately, consistently ideal brake force distribution to the rear wheel as well as fully independent brake management and control.

In the event of any deficiencies in the hydraulic pump or electrical components, the rear-wheel brake acts hydraulically as with a conventional system, overriding the integral function. This has no effect on the proper operation of the front-wheel brake, the only difference being that the ABS function is no longer operative in the event of such a deficiency.

## **ASC.**

Automatic Stability Control is a meaningful, additional assistance function particularly on a high-torque motorcycle and when riding under varying conditions with slippery surfaces. Indeed, ASC is the logical counterpart to ABS.

Automatic Stability Control prevents the rear wheel from spinning uncontrolled when accelerating all-out and thus avoids any loss of side forces and stability which otherwise would make the rear wheel swerve out of control. Lift-off detection and intervention serves furthermore to prevent the front wheel from moving up when accelerating under full power. Acting together, these two functions enhance riding stability and thus help to ensure a higher standard of safety on the road. And last but not least, the rider is able to deactivate ASC at any time, also while riding.

Like ABS, ASC is naturally also subject to certain restrictions in bends due to the riding physics of a motorcycle. And it is essential to note that ASC is not able to push forward, let alone override, the physical limits to the stability of a motorcycle when leaning over in a bend.

In its basic principles, the system and its various functions are quite straightforward: The ABS wheel sensors determine the speed at which the wheels are turning. Registering any sudden change in the difference in speed front-to-rear, the electronic control unit is able to detect any risk of the rear wheel spinning, engine management responding immediately by intervening in the ignition angle to take back engine power. Should this not be sufficient, that is should a greater reduction of engine power be required, fuel injection will be cancelled out for a certain time.

This kind of control and management is fast and sensitive, with any effects on riding comfort and dynamics being virtually negligible.

## **4.1 Three Generations of BMW Motorcycle ABS. Looking back at a Pioneering Achievement.**

Motorcycle experts certainly waxed lyrical back then in spring 1988, expressing their admiration for a “revolution in technology” and “the most significant progress ever made in the area of active safety”.

This was when BMW became the first motorcycle manufacturer in the world to introduce an electronic/hydraulic anti-lock brake system (ABS) in the BMW K 100. Weighing 11.1 kg or 24.5 lb, BMW Motorrad's revolutionary ABS was a great success from the start, with some 70 per cent of all purchasers ordering their K 100 with ABS as early as in 1989. And by the end of 1995, approximately 60,000 BMW motorcycles had been delivered to customers with the first generation of ABS technology.

In its configuration and system structure, this motorcycle ABS was quite different from the systems used in the automobile: Anti-lock brakes in the automobile incorporated hydraulic valves with cycle management serving to modulate brake pressure – a principle inevitably subject to a certain degree of unwanted feedback. At the time, therefore, using the valve systems available back then, the pressure pulses generated during application of the brakes with ABS were clearly noticeable on the brake lever.

This kind of feedback – or backlash, as one might also say – was regarded as unacceptable on the motorcycle, especially considering the wish to introduce the new technology on a broad scale. Indeed, movements of the brake pedal and unusual noises during application of the brakes with ABS had initially irritated customers right from the start when ABS technology was introduced for the first time in the passenger car.

Precisely this is why BMW Motorrad, cooperating at the time with FAG Kugelfischer, developed a plunger system operating without the slightest feedback or backlash. In this case a plunger masterminds the volume of brake fluid and, accordingly, the pressure acting on the brake whenever ABS is active. The brake lever (that is the handbrake or footbrake lever) is hydraulically separated in the ABS mode by a mechanical ball valve thus avoiding any kind of pressure pulse the rider might feel on the lever.

Positive response from customers confirmed from the start that this was the appropriate technical solution.

The next generation of ABS brake technology, BMW Motorrad ABS II, entered the market relatively soon in 1993. This was at the same time as the first model in BMW Motorrad's brand-new generation of four-valve Boxers, the R 1100 RS.

This new generation of ABS was hardly more than half the weight (5.96 kg or 13.14 lb) of the first generation, and was far more compact in its dimensions. Reliability was enhanced to an even higher level through the use of electronic systems in modern digital technology. The most significant improvement, however, involved the control system, integrated travel measurement determining the appropriate travel of the plunger in the system during the first control cycles and thus providing optimum brake pressure after just a few cycles, with only minimum adjustment being required thereafter (unless the rider encountered a sudden change in frictional coefficient). In practice, this meant soft and smooth brake control up to the tyres' maximum level of friction, capitalising on the motorcycle's brake power.

As a result of this superior technology, the number of BMW motorcycles equipped with ABS quickly rose to almost 90 per cent in Germany and an impressive 78 per cent on average for all markets. And by the year 2000, some 200,000 BMW customers the world over had opted for a motorcycle with ABS.

The third generation of ABS brake technology, BMW Motorrad Integral ABS, was presented at the INTERMOT 2000 Motorcycle Show and entered the market in spring 2001. Once again, this was a revolutionary step into the future, with electrical brake power assistance being realised for the first time on a motorcycle. With operating forces reduced to a minimum, this new technology ensured maximum brake power and performance enabling even the inexperienced rider to shorten stopping distances to a minimum whenever required in an emergency.

Further special features were the integral brake function connecting the front and rear wheel brake circuits. The overall configuration of the system with internal pressure sensors being used for the first time allowed load-related, adaptive distribution of brake forces on the two wheels of the motorcycle.

Despite this enhanced range of functions, the system was once again lighter than before, weighing just 4.35 kg or 9.59 lb, approximately 20 per cent less than ABS II.

The third generation of ABS brake technology with integral control continued its outstanding story of success in BMW motorcycles: By the year 2005, more than 80 per cent of all BMW motorcycles were fitted with this revolutionary system, some models even exceeding the 90 per cent mark. In all, more than 280,000 BMW motorcycles featuring Integral ABS were delivered to customers by the end of 2005, the total number of all BMW motorcycles with ABS delivered to customers even exceeding the figure of 500,000 units by September 2003.

ABS was also introduced as a standard feature on BMW Motorrad's entry-level F 650 GS in the year 2000. This is a BOSCH valve system without an integral function, since compact dimensions, very low weight, and an attractive price are the essential criteria for the lighter motorcycles in this segment.

An enhanced system based on this technology was introduced in 2006 in the new F 800 S/ST midrange models as well as the new R 1200 S Sports Boxer and weighs just 1.5 kg or 3.3 lb.

## 4.2 Function and Technology of the new Generation of Integral ABS.

Introducing the new generation of ABS brake technology, BMW Motorrad is changing over to a new, even more advanced system featuring valve-based pressure control also on Integral ABS. Progress in hydraulics, in the area of control valve technology, and in electronics now allows the same comfortable operation of the system with minimum feedback as in the case of plunger systems or ram pressure concepts.

In its fundamental configuration of brake hydraulics and valve management, BMW Motorrad's new Integral ABS is comparable with other valve-controlled ABS systems. The special features of BMW's system lie in the concept of pressure management, the use of intelligent control strategies, and in the integral function. The latter is a semi-integral system, meaning that whenever the rider applies the front-wheel brake by means of the handbrake lever, the brake circuit for the rear wheel is automatically also activated in the same process. The footbrake lever, on the other hand, acts solely on the rear wheel brake.

BMW Motorrad's new Integral ABS is being introduced step-by-step on all models in the new K and Boxer generation (with the exception of the BMW R 1200 S), replacing the previous system.

### **Hydraulic and pressure control functions.**

The overall principle followed by BMW Motorrad's new Integral ABS is relatively simple: Brake pressure generated manually by the rider via the brake lever and the main brake piston is transferred via an open valve (the intake valve) directly to the appropriate wheel brake. As soon as the wheel sensors and electronic management determine that a wheel is about to lock, the intake valve is closed and an outlet valve arranged in parallel in the wheel brake circuit is briefly opened. This allows brake fluid to flow through the outlet valve into a reservoir (low-pressure storage), very quickly reducing brake pressure on the appropriate wheel brake (if necessary down to zero).

This operation of the valves is accompanied by activation of an electrically driven hydraulic pump delivering the brake fluid flowing out of the wheel brake circuit back into the control circuit and thus setting off the volume in the respective brake circuit. Then, once the wheel is able to turn again freely, the outlet valve is closed and the intake valve is opened, re-establishing the hydraulic connection between the brake lever and the main brake piston.

Now brake pressure built up by the rider via the brake lever once again increases hydraulic pressure in the brake callipers. Appropriate control and operation of the valves, finally, serves to modulate brake pressure, adjusting the stopping forces acting on the wheel to the current frictional coefficient and road conditions.

**Analogue pressure management for fine-tuning system pressure.**

Modern hydraulic valves with an adjustable cross-section are featured on the intake side. Appropriately controlled and operated, they allow continuous, ongoing management of volume flow in building up pressure on the wheel, thus providing analogue-based pressure control of the brake. This ensures a significantly higher standard of control quality and precision over previous valve systems with a fixed, pre-set opening cross-section limiting their operation to simple “black-or-white” control when opening and closing.

In conjunction with appropriate control strategies, BMW Motorrad’s new Integral ABS is able to build up pressure quickly during the control cycles and adjust system pressure with a high level of precision. This, in turn, reduces pressure pulses and, accordingly, any “kick-back” effect on the hand lever, making the entire control process smoother and more comfortable.

Three additional pressure sensors in the system continuously monitor pressure conditions. With system pressure being masterminded and determined in this way, and with previous cycles being evaluated, the system is able to specifically control brake pressure as needed, setting pressure to the respective level required and thus reducing the number and intensity of control functions during operation of the brakes in the ABS mode. Provided there is no sudden change in frictional coefficient, only fine-tuning of brake pressure is then required after the first control cycles. This ensures smooth and comfortable application of the brakes with optimum stopping power close to the respective friction limit. And with modulation of brake pressure being relatively small, variations in wheel load and, accordingly, movements of the vehicle are kept to a minimum, enhancing riding stability and giving the rider an even better feeling of all-round safety.

BMW Motorrad’s new Integral ABS no longer requires an electrical brake servo. Rather, recent developments in brake hydraulics ensure very rapid build-up of pressure and – just as important – virtually spontaneous reduction of pressure in the control phase. This ensures immediate reaction of the system under all conditions to the rider’s specific need for brake power as well as smooth and precise control by means of hydraulic operation alone.

### **Wheel brake circuits separated completely from one another.**

The brake circuits for the front and rear wheel on BMW Motorrad Integral ABS are separated completely from one another, and are not linked by any kind of hydraulic connection. This ensures a clear and straightforward brake feeling at all times with a clearly defined pressure point particularly on the front-wheel brake under all conditions.

Brake pressure on the front wheel is generated in the conventional process by the rider via the main brake piston in the control lever and acts directly on the front brake calliper. Wherever the ABS control function is required, the electronic control unit modulates brake pressure via the valves in the brake circuit, as described in the foregoing.

The rear-wheel brake is also operated in the usual way by the rider pressing down the footbrake lever. As long as he presses down the footbrake lever only, the footbrake will generate the brake pressure desired in an all-mechanical/hydraulic process, pressure acting on the rear-wheel brake only. Whenever necessary (that is with the wheel threatening to lock), brake pressure is controlled appropriately via the ABS valve system.

### **Integral brake with electrohydraulic pressure generation.**

To activate the integral function, brake pressure for the rear-brake is generated actively via an electrohydraulic high-pressure pump as soon as the rider pulls the handbrake lever. The pump is switched on automatically every time the rider uses the front-wheel brake and is masterminded by the pressure sensors in the front-wheel brake circuit. Geared to brake pressure on the front wheel, appropriate pressure is built up automatically on the rear-brake in accordance with the brake force distribution predetermined by the control unit, the rear wheel thus being decelerated ideally with every application of the front-wheel brake (semi-integral function).

Even when using the integral function, the rider has the option to brake the rear wheel harder via the footbrake lever than the integral system as such would allow. This he can do up to the rear wheel locking point where ABS cuts in. Should the brake pressure applied by the rider be weaker than the pressure generated via the integral function, the rider's operation of the footbrake is not taken into account and the rear-wheel brake is applied in accordance with the integral function.

Ideal brake force distribution between the front and rear wheel changes as a function of the load the motorcycle is carrying. The integral brake is also able to take load conditions into account by adjusting accordingly. Comparing wheel locking pressure in the wheel circuits, pressure measurement within the

system provides an indication of the load the motorcycle is currently carrying and adjusts brake force distribution accordingly whenever the brakes are applied in the ABS mode.

In all, electrohydraulic generation of brake pressure for the integral function ensures perfect adjustment of rear-wheel brake pressure under all conditions as a function of front-wheel deceleration (ideal distribution), load conditions, and the frictional coefficient.

Only this method of generating pressure is really able to give priority to the rider's specific wishes and operation of the brakes, whenever appropriate. And should the hydraulic pump ever fail to operate, the parallel hydraulic circuit on the footbrake lever will act by itself, the rear-wheel brake operating in the same way as a conventional hydraulic brake.

### **Semi-integral function for extra safety and stability.**

A point to be emphasised once again here, since it is often underestimated, is the advantage of the semi-integral brake concept with independent, optimum distribution of brake power on both wheels. When applying the brakes under "normal" conditions below the maximum limit of deceleration, that is in the most common situation in everyday traffic, the rear wheel is able to convey significant stopping power to the road. Since lateral guidance forces on the tyre decrease as a function of increasing brake power, better distribution of brake power between the two wheels enhances both safety reserves and lateral stability. This advantage is particularly significant in braking manoeuvres often forced upon the rider in a bend, where the degree of stopping power and deceleration required depends on the specific situation encountered by the rider.

Should the rider apply the brakes in such a situation only on one wheel, the wheel involved (generally the front wheel) has to convey the full power of the brake and is therefore only able to build up a low level of lateral support and guidance.

The integral system, by contrast, distributes brake power ideally to both wheels, providing a higher level of lateral and side support on each wheel (naturally as long as the brakes do not enter the ABS mode). This ensures maximum brake stability within the physical limits applicable in each case.

Apart from increasing side forces, the semi-integral function also ensures better detection of a rear wheel lifting off when applying the brakes all out. While conventional two-channel ABS brake systems are only able to evaluate wheel speed signals, BMW Motorrad's integral system provides more information, monitoring both pressure signals in the two brake circuits and the speed of both wheels and thus determining the degree of stopping power and, accordingly, any tendency of the rear wheel to lift off.

The system is therefore able to effectively counteract such behaviour in good time by specifically reducing brake pressure on the front wheel in the interest of enhanced riding stability and maximum stopping power. And a further advantage is that the system actively detects current riding conditions, thus also taking the load the motorcycle is currently carrying into account.

### **Compact and light pressure modulator serving as the heart of the system.**

All function units of BMW Motorrad Integral ABS are housed within the pressure modulator. This compact control system accommodates the control valves, pressure sensors and hydraulic pumps including their electric motor, as well as the electronic management system.

The pressure modulator is therefore quite literally the “heart” of BMW Motorrad’s Integral Brake System. Nevertheless, the entire unit weighs just 2.3 kg or 5.1 lb and is therefore approximately 50 per cent lighter than the former system.

### **Diagnostic function and failsafe operation.**

BMW Motorrad’s new Integral ABS also benefits from full diagnostic control: all functions and sensors are permanently monitored by the system’s electronic “brain”.

Versus the former system, the duration of the initialisation phase after switching on the ignition is now far shorter. Malfunctions, should they occur at all, are saved in a non-volatile memory and may be subsequently read out in the workshop. Should the electrical or electronic components suffer a deficiency, in turn, the control valves are moved mechanically (by springs) to their basic setting, thus always maintaining a direct hydraulic connection between the brake controls and the brake callipers, as in the case of a conventional brake system without ABS. Under such circumstances the brakes will operate as usual in terms of brake power and application, only ABS control and, where applicable, the integral function no longer being available.

### **Deactivation of ABS for offroad use.**

On the R 1200 GS/GS Adventure, the rider once again has the option to deactivate BMW Motorrad’s new Integral ABS for offroad use. Even when ABS is deactivated, however, the system maintains its integral function, which may often prove very helpful when riding offroad. To hold the motorcycle in position on a slope with loose ground beneath, for example, all the rider has to do with Integral ABS is pull the handbrake lever. This will apply the brake on the rear wheel with a good and strong effect (due to

the wheel load being shifted to the rear wheel), keeping the motorcycle safely in position and preventing it from slipping back. Setting off in such a situation is also facilitated by the system, since the rider no longer needs his foot to apply the brakes and is therefore able, whenever necessary, to use both feet for extra support on the ground.

## 4.3 Function and Technology of BMW's new ASC.

ASC (Automatic Stability Control) limits and controls spin on the rear drive wheel. It therefore prevents the rear wheel from spinning out of control under acceleration on slippery surfaces and helps to avoid a possible loss of lateral stability.

Acting as the logical counterpart to ABS, ASC is the first step towards enhanced rider assistance systems controlling riding dynamics on the motorcycle. Currently BMW is the only motorcycle manufacturer in the world to offer traction support as an option on series production motorcycles: Upon the introduction of ASC in 2007, customers will be able to order this revolutionary new system for all Boxer models with the exception of the R 1200 S Sports Boxer and the K 1200 GT.

ASC is available only in combination with Integral ABS (while ABS without ASC is naturally still available as before).

ASC assists the rider when accelerating on difficult and slippery surfaces, and offers extra safety particularly on rapidly changing road surfaces difficult to assess in terms of surface grip and friction. It is not conceived, however, for maximum acceleration or for accelerating all-out while leaning over sharply, for example in a bend.

Within the usual limits of physics, however, Automatic Stability Control is able to reduce any side swerve effect of the rear wheel also in a bend, thus helping to enhance the motorcycle's riding stability. But it is important to note that ASC cannot enhance the natural, physical limits to the stability of a single-track vehicle, and that it does not relieve the rider from the need to use engine power appropriately when leaning over to a low angle.

An additional function of ASC is that it prevents the front wheel from lifting off when accelerating under full power – again an important contribution in the interest of extra safety.

### **Function and control.**

ASC uses the ABS wheel sensors to monitor the speed at which the wheels are turning and also applies the diagnostic functions offered by these sensors. Wheel spin, in turn, is determined by the engine's electronic "brain" comparing the speed of the front and rear wheels. Should the system detect any

tendency of the rear wheel to spin, electronic engine management will intervene accordingly, setting drive forces to the limit the tyre is still able to convey. The first step in this process is to reduce torque by adjusting the ignition angle (or, to be more specific, by retarding the ignition timing point).

Should a greater reduction of engine power be appropriate, fuel injection will be stopped for a certain period.

An advantage of this control function is that it is quick and sensitive, with hardly any impairment of riding comfort and dynamic performance. The rider is informed of the function when active by a telltale flashing on and off quickly in the control panel. And if the rider does not wish to use ASC, he is able to deactivate the system at any time, also while riding, simply by pressing a control button.

#### **Additional offroad set-up for the GS models.**

An additional offroad set-up has been developed and memorised within the control system for offroad use of the R 1200 GS and R 1200 GS Adventure. This special offroad mode takes wheel slip and spin conditions on loose surfaces into account, allowing a higher level of spin under such circumstances. Pressing the ASC button, the rider is able to switch over from the road to the offroad mode and vice versa. It is important to note that the offroad set-up is not suitable for road use.

#### **Supreme functional safety and reliability through integration of control systems.**

ASC Automatic Stability Control has been developed together with BMW Motorrad's new Integral ABS and the ASC software programmed as part of the overall engine control electronics. This saves the need for a separate ASC control unit, reducing weight and space requirements accordingly. Full integration of the system also saves the need for additional connections in the interest of enhanced safety and minimum risk of interference.

Like all electronic control functions, ASC also features self-diagnosis and a defect memory for reading out information when the motorcycle is serviced. And should, finally, ASC not be available, the rider is informed accordingly by the telltale on the control panel.