

1. The new BMW R 1200 GS.



The inventor of the touring enduro sets new standards.

- New dimensions in dynamics, agility, riding pleasure, and safety.
- Excellent offroad qualities plus onroad features enhanced to an even higher level.
- Reduction in weight by 30 kg (66 lb) ensured by precise calculation, intelligent lightweight construction, and the use of high-strength materials.
- New 1,200-cc flat-twin power unit with balance shaft for supreme smoothness.
- Torque and output up by almost 18 per cent.
- Fuel consumption down by 8 per cent.
- Highly advanced, newly developed engine electronics and the latest emission technology for optimum environmental compatibility.
- Quiet exhaust system with a throaty sound.
- All-new six-speed gearbox with superior running smoothness and shift comfort.
- Newly developed lightweight Paralever with weight-optimised driveshaft.
- New Telelever for even greater precision in front wheel guidance plus low weight.
- Extra stiff running gear for supreme riding safety, outstanding directional stability up to top speed, superior handling and unprecedented accuracy in bends.
- High-performance EVO brakes with on-demand Integral ABS.
- High-strength cast light-alloy wheels and cross-spoke wheels available as an option.

- Electronics used to ensure sensible function with fewer cables and lower weight.
- Electronic immobiliser fitted as standard.
- Wide range of equipment and tailor-made accessories to BMW's high standard.

Even more agile, more powerful and lighter for maximum riding pleasure on and off the road.

The new BMW R 1200 GS fulfils the old dream of the ideal touring enduro: Superiority in every respect, outstanding performance and superior comfort even on the longest tour, equally superior handling and agility for maximum riding pleasure on winding country roads and mountain passes give the rider exactly what he wants. Add to this low weight of just 225 kg or 496 lb quite unique in this class, plus outstanding chassis and spring qualities, and you can be sure to enjoy even the toughest tours on the roughest terrain.

The BMW R 1200 GS offers an unparalleled synthesis of harmony in its combination of offroad and onroad riding qualities. With its predecessor, the R 1150 GS uniquely successful over so many years, setting the standard in its segment consistently throughout its lifecycle, the R 1200 GS now takes you into a new dimension, raising the outstanding features of its predecessor to an even higher level on all important counts.

At the same time it goes without saying that the R 1200 GS continues all the traditional features and fortes so characteristic of all BMW motorcycles: First-class and extra-safe riding conditions ensured by even more stable running gear with the unique BMW Telelever for the front wheel and a newly designed weight- and geometry-optimised Paralever at the rear.

High-performance brakes of the highest calibre together with BMW's unique Motorcycle Integral ABS guarantee supreme safety even in a critical situation. Superior environmental compatibility, in turn, is ensured by a fully controlled three-way catalytic converter with the most advanced emission management – a technology, incidentally, which has been a natural feature on all BMW motorcycles for years.

Equipped with dual ignition, brand-new Digital Motor Electronics featuring integrated knock control, as well as further improved catalytic converters and separate oxygen sensors for each cylinder, the R 1200 GS increases the leadership of BMW motorcycles in the large-volume touring enduro segment to an even higher standard than ever before.

A further feature not to be forgotten is the maintenance-free driveshaft avoiding the need for unpleasant and time-consuming service particularly on long trips. The sophisticated new luggage system as well as the wide range of accessories available straight from the factory and tailored to the R 1200 GS also help to clearly prove that this new machine is powerfully continuing the tradition of large-capacity BMW touring enduros which now goes back almost 25 years to the R 80 G/S launched in 1980: This is most certainly the original straight from the inventor of this type of motorcycle, a machine once again setting the standard in this class.

New engine – even more powerful, comfortable, and cleaner.

In its design principle and fundamental structure, the newly developed flat-twin power unit of the R 1200 GS follows the same standards as BMW's former, proven engine. But at the same time the new power unit is a new development all-round, with fully revised and improved components. Optimisation of engine geometry and application of the most advanced calculation and simulation methods serve to reduce the weight of the engine by 3 kg or 8 per cent despite its larger capacity and wider range of functions. Engine width, in turn, is the same as before.

This is the biggest engine ever seen in an enduro so far, the increase in cubic capacity to 1,200 cc providing the foundation for superior output of 100 bhp (74 kW) (72 kW/98 bhp in Germany) and muscular torque throughout a speed range wider than ever before in the past. The result is superior power under all conditions and in all situations – clearly a great advantage above all on difficult offroad terrain, with power and torque constantly available regardless of engine speed, the gear in mesh, and the conditions facing the rider.

Crankdrive and engine block – 1,200 cc and balance shaft to eliminate all vibrations.

The most important innovation featured on the basic engine block is the balance shaft eliminating any unpleasant vibrations: Despite their superior design principle with the cylinders opposing each other to provide a perfect balance of free mass forces (connecting rods and pistons moving to and fro) in their overall effect, conventional flat-twin engines cannot run entirely without vibrations. The inevitable displacement of the cylinders always generates “circulating” mass forces (that is forces not acting on one and the same level) causing unpleasant vibration the rider will feel on the handlebar, footrests and seat. The severity of such mass forces and the vibrations caused in this way increases as a function of engine size and, in particular, engine speed.

Precisely this is why the engine of the R 1200 GS is the first power unit in the history of the Boxer engine to feature a balance shaft: Running in the opposite direction, the shaft carries two balance weights 180° apart from one another and exactly spaced out in size to provide a counter-force which, superimposed

on the mass forces in the crankshaft, reduces vibrations to an absolute minimum. This keeps running conditions smooth and comfortable throughout the entire speed range, vibrations even being dampened in particular at low engine speeds without the flat-twin losing its bullish character.

The balance shaft itself is arranged exactly where it should be, saving space through its intelligent and elegant concept: Running in anti-friction bearings, the balance shaft is positioned within the countershaft and is driven by a spur gear from the crankshaft (1:1 transmission ratio). The rear balance weight is outside of the oil cavity and is bolted on to the shaft extending completely from one end to the other. The front balance weight, in turn, is integrated in the drive sprocket.

Like on the former engine, the countershaft again serves to drive the oil pumps and carries the sprockets driving the camshaft. The transmission ratio of the countershaft versus the crankshaft is therefore 2:1, the countershaft itself being driven by a roller chain.

The crankshaft is also a new design from the ground up – it is now even more compact in the interest of extra stiffness and the cranks themselves are even closer together (a modification made possible, inter alia, by the narrower counterweights). Despite the increase in lift from 70.5 mm or 2.78" to 73 mm or 2.87", this change in design helps to reduce weight by 1 kg or approximately 9 per cent. And to give the crankdrive the balance effect required, some of the counter-masses have been moved to the flywheel and the drive gear on the balance shaft.

As before, the flywheel holds the single-plate dry clutch enlarged in diameter from 165 to 180 millimetres (6.50–7.09"). The clutch lining is free of asbestos and heavy metals, the pressure plate, membrane spring and gear plate being balanced individually to allow easy and convenient assembly of these components without any negative effects on running smoothness.

The structure of the pistons has been only slightly modified versus the previous engine, the new power unit featuring lightweight box-type pistons with three rings which, weighing just 410 grams, are once again a bit lighter still than the former pistons (420 grams).

The crankcase is a lot lighter than before, use of the most advanced computer methods together with innovative casting technology serving to optimise wall thickness as well as the stiffness and strength of the crankcase, weight being reduced in the process by 1.4 kg.

Well-conceived and effective solutions are also to be found in – seemingly insignificant – details such as the crank cavity air purge: To minimise undesirable pressure pulses within the cavity, with air pressure going up and down as a result of piston motion, a valve complete with membrane openings fitted here opens and closes the air purge outlet automatically as a function of pressure conditions in the crank cavity and at the same time provides a large air purge cross-section whenever required. This serves to reduce pressure fluctuations and air flow in the crankcase to a minimum, with an advantageous effect on engine output, internal efficiency (reduction of ventilation loss), oil foaming, and oil consumption particularly at high speeds.

Modified cylinder heads and lighter valve drive.

Maintaining their basic design and configuration, the cylinder heads have also been modified. From outside they are recognisable by their different contours with striking cornered valve covers.

The principle of chain-driven camshafts below the valve plane and the operation of valves by means of tappets and rocker arms has been maintained. The reason, quite simply, is that this design concept has proven its qualities countless times – and although it is not necessarily designed and laid out for high speeds, the concept has confirmed its qualities and reliable function even under tough racing conditions in the BMW Motorrad BoxerCup. The big advantages of arranging the camshafts in this way are the economic use of space available (width of the cylinder head) and the ease of maintenance so important both in everyday use and on long journeys (adjustment of valve clearance).

Valve diameter is up by 2 mm or 0.79" (intake 36.35 mm/1.43" versus the former 34 mm/1.34"; outlet 31 mm/1.22" versus 29 mm/1.14"). To ensure better and more efficient dissipation of heat, the outlet valves are filled with sodium. Valve duct design has been modified to match the larger valve diameters and the duct contours have been improved in their dynamic flow conditions. In conjunction with the increase in engine capacity, these modifications contribute to the 18 per cent increase in engine output (74 kW/101 bhp) and torque (115 Nm/85 lb-ft). As the final result of this design improvement using the most advanced, computer-aided methods, weight of the cylinder heads has been reduced by 15 per cent.

Internal oil cooling of the cylinder heads already featured on the former engine has been adjusted to the higher level of output and torque by improving flow conditions and avoiding any kind of throttle effect. Oil cooling improves the dissipation of heat from the valve rim and ensures a more consistent distribution of temperature within the cylinder head. All this contributes to the engine's robust thermal stability and helps to ensure the high standard of reliability so typical of a BMW. And these are definitely the criteria that count when travelling full of luggage to all four corners of the globe under the most difficult conditions.

New engine management now featuring two oxygen sensors, modified dual ignition and knock control.

The new R 1200 GS further improves the leading position BMW Motorrad has had for years in the area of electronic engine management. The Digital Motor Electronics code-named BMS-K (BMW Engine Management System) is an in-house development tailored specifically to the requirements of a motorcycle. Fully sequential fuel injection, integrated knock control, faster processing of complex sensor signals by means of the most advanced microelectronics, compact layout and low weight are the most important features worth mentioning in this context.

The principle of indirect air volume monitoring and control by means of the throttle butterfly angle and engine speed (alpha-n control) carried over from BMW's existing motorcycles has been further enhanced on the R 1200 GS, creating a concept referred to as torque-based engine management.

The basic parameters determining the optimum engine operation point remain engine speed and the throttle butterfly angle monitored by a separate potentiometer on each cylinder. Applying additional engine and ambient parameters (such as engine temperature, air temperature, and air pressure), engine management, together with control maps and correction functions contained within the system, tailors the injection volume and ignition timing exactly to the engine's and rider's current requirements. Taking so many factors into account, the system is able to control torque with supreme accuracy, adjusting engine running conditions perfectly to all relevant parameters.

Fuel is injected into the intake duct exactly as required and exactly on time for the intake cycle of the respective cylinder (fully sequential fuel injection). With one oxygen sensor being allocated to each cylinder, fuel/air composition is controlled individually in each cylinder according to current requirements. Both oxygen sensors are arranged close to the engine in the respective exhaust manifold, thus ensuring individual and even more precise emission management. Whenever necessary, the fuel/air mixture may be adjusted much faster than before, naturally with individual control and adjustment of each cylinder.

The positive results of this process are exemplary emission management, greater fuel economy, improved riding conditions, and an even finer response to the rider's commands. Or, to put it in a nutshell, even greater environmental compatibility together with enhanced sheer riding pleasure.

BMS-K also incorporates all the functions of automatic idle speed control as well as cold start enrichment with warm-up control. An appropriate increase in idle speed while warming up is ensured automatically and exactly on demand by so-called “idle speed steppers” (controlled bypass ducts for additional air) integrated in the throttle butterfly manifolds, together with a corresponding adjustment of the fuel injected.

Featured in all BMW Boxers (with the exception of the 850-cc power units) since 2003, dual ignition has been further modified and improved in the R 1200 GS. The auxiliary spark plug is now arranged at the outer edge of the cylinder, the ignition timing of both plugs being freely programmable and possibly varying in time as a function of load and engine speed in order to further optimise running smoothness, emission management, and fuel economy. Referred to as phase shift, this adjustment process is maintained consistently all the way from part load to full load.

In practice this means different ignition timing points on both spark plugs in defined control map areas: When approaching full load where dual ignition no longer provides any benefits, the phase shift effect is so large that the spark crosses over on the auxiliary plug in the expansion cycle (60° aTDC). For all practical purposes this corresponds to single ignition on the central spark plug under full load.

The BMW R 1200 GS introduces a new system of knock control never seen before with these features in a motorcycle engine. Knock combustion is recognised by a solid body sound sensor matched specifically to the cylinders. Receiving the appropriate signals, the electronic engine management will take back the ignition angle (i.e., it retards the angle) and protect the engine from possible damage. Engine temperatures are also taken into account in evaluating the signals, helping to supplement the safety function.

Benefitting from knock control, the geometric combustion ratio on the engine has been increased to 11.0:1, certainly a remarkable figure for an air/oil-cooled engine with cylinders of this size. Specific fuel consumption benefits accordingly, the R 1200 GS being almost 8 per cent more fuel-efficient than its predecessor in the EU2 test cycle.

Designed for unleaded premium fuel (RON 95), the engine, thanks to knock control, is able to run also on regular fuel (RON 91) or other fuel qualities sometimes to be found in various countries, without requiring any kind of manual intervention or adjustment. Within the limits available, knock control adjusts the ignition angle automatically to the fuel on which the engine is running.

Interacting with a wide range of sensors, knock control adjusts to even the most extreme conditions and requirements, for example with the engine having to withstand extremely high temperatures and thermal exposure in desert areas. To provide this reliability, the electronic engine management adjusts engine running parameters and thus ensures supreme reliability under all conceivable operating conditions.

Intake manifold – larger volume for an optimum cylinder charge.

Numerous calculations and examinations of the entire cylinder charge process, taking the intake manifold into account, were required in order to achieve an optimum charge cycle throughout a wide range of engine speed. Increasing the capacity of the airbox to almost 9 litres, BMW's engineers have made the very best out of the geometric conditions dictated by the machine and the specific position of the manifold, naturally taking all ergonomic requirements into account.

To filter the intake air, the R 1200 GS uses the paper filter system already very effective in the R 1150 GS. In designing and configuring the shape of the intake funnel, the responsible engineers have succeeded in creating perfect harmony of flow conditions, on the one hand, and acoustic requirements (level of intake noise), on the other.

**Exhaust system –
efficient sound engineering for low noise with a throaty chortle.**

The exhaust system is made up of two manifolds, a pre-silencer with catalytic converter, and a tailpipe muffler. The entire system all the way to the pre-silencer fitted beneath the gearbox is a twin-chamber configuration made consistently of stainless steel. Weighing exactly 10.7 kg or 23.6 lb overall, the emission system is approximately 33 per cent lighter than on the former model.

Flowing through the two single manifolds, exhaust gas merges in a Y-shaped unit combining the two flow processes and continuing straight into the pre-silencer housing the central catalytic converter. An interference tube close to the engine between the two manifolds provides the appropriate balance of pressure and helps to boost engine torque at low and medium speeds. With cell density of 200 cell units/square inch, the metal-based catalytic converter comes with a rhodium/palladium coating combining high temperature resistance with a long service life.

Introducing an all-new tailpipe muffler, BMW Motorrad has succeeded in creating an ideal match of smooth torque, low noise and a pleasant sound pattern. The interior structure of the muffler is based on the reflection principle, an inner sleeve with absorption material serving additionally to dampen high frequencies.

The muffler is oval in shape not only for optical reasons, but also to minimise the transmission of noise for even smoother and more pleasant riding conditions. A further special feature is the pressure-controlled valve integrated in the muffler and controlling exhaust gas counter-pressure for an additional reduction of noise under the engine's primary running conditions, that is at medium to low engine speeds, thus keeping engine noise at a low level both objectively and subjectively, while at the same time giving the rider that "throaty" chortle he – or she – appreciates so much.

Both alternator and starter lighter than before.

Apart from the mechanical components in the engine, the electrical ancillary units also help to reduce weight to a minimum. To begin with, the R 1200 GS features a newly developed lightweight alternator with maximum power of 600 W. The layshaft starter has also been optimised for lower weight, and just like the battery it is absolutely free of maintenance requirements. In all, the total weight saving on the electronic components is 2.2 kg or 4.9 lb, that is 17 per cent lighter than before.

New six-speed manual gearbox with helical gears.

The R 1200 GS retains the proven principle of separating the gearbox from the engine – and at the same time the six-speed manual gearbox is an all-new development with features significantly improved once again over the previous version. Weight has been reduced to approximately 13 kg or 28.7 lb and for the first time BMW is using high-strength helical gears with smoother and more gentle gear mesh ensuring low noise and a high standard of refinement.

All gear increments are designed for active riding behaviour, meaning that sixth gear is not an overdrive or economy gear, but rather has an appropriately "short" transmission ratio.

The gear shafts run in anti-friction ball bearings, the gears themselves in low-friction needle bearings. The ball bearings come in clean bearing mounts sealed at the surface to keep out even the finest particles. This allows even longer maintenance intervals and reduces the cost of service, with only one oil change required in the gearbox every 40,000 km or 25,000 miles.

The gears themselves are shifted by means of a shift roller, shift forks and shift sleeves (as opposed to shift gears used in the past) to ensure smooth positive engagement of the gears. Made of aluminium, the hollow shift roller runs on ball bearings. Detailed improvements to optimise friction on the shift box, the shift shaft and forks improves gearshift operation once again and guarantees accurate, safe mesh on all gears.

Lightweight driveshaft and Paralever swinging arm – an innovative rendition of a traditional principle.

An absolutely indispensable feature of the new R 1200 GS like on all BMW Boxers is the traditional, maintenance-free driveshaft extending to the rear wheel. Having proven its merits for more than 80 years, this is the only logical drive concept with the crankshaft in longitudinal arrangement. And in practice this concept means supreme customer benefits, considering that chain drive, despite many improvements over the years, is not quite appropriate, given the need to regularly tighten the chain and the short lubrication intervals, for a large-capacity, high-power touring enduro.

Over the years BMW has consistently improved the driveshaft principle, meeting new requirements and demands in the process. The biggest innovation came in 1988 with the introduction of the Paralever swinging arm on the most powerful enduro at the time, the BMW R 100 GS: Using an additional pivot between the final drive and the swinging arm, BMW's engineers were able to disconnect the unavoidable reaction of the driveshaft from the swinging arm, thus eliminating the often-criticised "elevator effect" with the rear end moving up and down when accelerating and applying the brakes.

A further advantage provided by the Paralever is that the springs do not harden when accelerating all-out, providing a significant improvement of traction as an important feature when driving up steep gradients on very rough terrain.

Considering these significant benefits, the higher weight and the increase in unsprung masses with a driveshaft versus chain drive are insignificant.

Still, in the process of developing the R 1200 GS BMW's engineers did not stop until even this feature of the system more noticeable with an enduro used offroad than on the road, had ultimately been properly improved. Accordingly, the entire drivetrain of the new R 1200 GS has been redesigned all the way to the rear wheel and all features have been optimised. The result is a drivetrain which, together with the much stiffer Paralever swinging arm, reduces weight by approximately 10 per cent. Unsprung masses are down accordingly, ensuring an even more sensitive response than before on the rear wheel suspension already acknowledged for its superior qualities.

The main components of this new system are the axle drive and the swinging arm itself. Made of an ultra-strong cast aluminium alloy, the Paralever swinging arm, through its design and specific dimensions tailored to load conditions, is even lighter than before but also stiffer and stronger.

The geometric configuration of the entire swinging arm has likewise been modified, dive compensation is now almost 100 per cent. With forces acting on the final drive housing now being supported above the swinging arm, ground clearance at this point is greater than before, efficiently protecting the swinging arm even on very rough terrain against damage caused by rocks or similar objects.

The swinging arm itself is a two-piece forged aluminium unit. Another new feature is the re-configuration of the swinging arm mount moved from the final drive to the rear frame again in the interest of extra strength and robustness under the most extreme offroad conditions.

The pivot point of the axle drive unit resting in the swinging arm has been moved down to provide a more favourable geometric arrangement with greater stiffness. The bearing point, in turn, has been reinforced to match the higher load and forces from the more powerful engine.

With its improved kinematics, the driveshaft no longer changes in length as a result of geometric conditions. This also helps to save weight, since the length adjustment unit formerly fitted is no longer required. The shaft itself now comes as one single piece and – like before – runs without oil in the shaft sleeve.

The final drive housing is matched in its size and dimensions precisely to the inner contours of the angle transmission, avoiding even the slightest waste of space.

The crown wheel has been re-calculated and is also lighter than before, the wheel flange now being made of aluminium in order to save weight. With its larger diameter, the flange offers the wheel better support, with additional weight-saving potentials for the rear wheel around the hub.

The outer sign of distinction and a visual highlight of this extremely compact and elegant lightweight structure is the 50-mm hole drilled through the axle pipe of the final drive housing. The final drive itself comes with a lifetime oil filling, meaning that there is no need to change the final drive fluid throughout the entire running life of the motorcycle.

In re-configuring the design principles of the entire machine, assembly of the final drive has been simplified and further refinements introduced:

The hollow axle sleeve helps to dissipate heat from the final drive through its large surface and efficient flow effects. Signals for the ABS brake system and the speedometer are read by a sensor directly in front of segment pieces on the crown wheel, making the outer emitter wheel used on the former model superfluous on the new machine.

Increasing the diameter of the drill holes on the wheel flange, BMW's engineers are able to use five light wheel bolts measuring 10 mm in diameter and with longer expansion length instead of the former relatively heavy wheel bolts with a cone. This means even greater safety once again in bolting on the wheels and allows use of a smaller wheel bolt wrench (which means less weight in the toolkit).

New running gear – stiff, high-strength steel tube frame.

The R 1200 GS retains the basic configuration of all Boxer suspension concepts with the engine/transmission unit serving as a load-bearing element and the wheel guidance components being bolted on to the frame.

The Telelever longitudinal arm, in turn, pivots on the engine housing, as before. The actual frame of the R 1200 GS is made up of the front subframe supporting the Telelever at the top and the rear frame with its integrated swinging arm mount.

The engine/gearbox unit is bolted on to the rear frame at five and on to the front frame at four points. Together, this composite structure incorporating the drive unit forms the motorcycle's load-bearing framework.

The two frame elements of the R 1200 GS are lightweight structures in what is called truss design: The front frame is a triangular structure made up of high-strength steel tubes welded to one another. It offers the great advantage of highly robust support on offroad terrain plus package benefits over the former cast aluminium front frame as well as greater stiffness with weight remaining unchanged.

The rear subframe is also made up of straight steel tubes welded to one another. Precise calculation of all tubes serves to optimise both tube diameter and wall strength to exactly the right requirements, creating an overall configuration of maximum stiffness and strength on low weight. New features are the special mounts for the side-stand and main stand as well as the driver's footrests connected directly to the rear subframe. The side-stand, incidentally, folds in easily and conveniently even when the rider is already sitting on his machine.

Refined Telelever ensuring even greater stiffness.

To this day, no other system of front wheel guidance and support is able to match the first-class functions and qualities of the BMW Telelever introduced in 1993 on the four-valve Boxers. The revolutionary principle of the Telelever using a wishbone to relieve the telescopic arm of longitudinal and lateral forces ensures unprecedented, highly sensitive front-wheel response on all road surfaces, together with tracking stability never seen before. The big advantages of this design concept are therefore supreme riding precision and accurate response combined with equally supreme suspension comfort and anti-dive control.

Refinement and modification of the front wheel geometry now further improves the qualities of the Telelever on the R 1200 GS over the former model. The longitudinal arm is an all-new, extra-strong and light forged aluminium component. In the interest of superior handling, front wheel camber has been reduced by 5 mm or 0.20" to 110 mm (4.33"), the steering head angle remaining at 62.9° in standard position. A change in front wheel kinematics eliminates brake dive to an insignificant residual effect actually desired to give the rider the right feeling. The superior stiffness of the Telelever, in turn, has been further enhanced by once again increasing the diameter of the support tube from 35 mm (1.38") to 41 mm (1.61"), thus making a further contribution to the crisp and clear riding behaviour of the R 1200 GS.

An important detail is the holes drilled into the lower fork bridge efficiently distributing brake pressure to the steel flex brake hoses for the right and left brake callipers without requiring an additional distributor unit.

Featuring fully encapsulated ball joints with permanent lubrication and with a lifetime oil filling in the telescope, the entire Telelever is absolutely maintenance-free.

Suspension with adjustable spring base and TDD spring strut at the rear.

To optimise riding qualities off the beaten track, the spring base of the front gas pressure spring strut is mechanically adjustable to 9 different position in order to provide extra reserves even under the toughest offroad conditions. Spring travel at the front is 190 mm or 7.48", with a 68 mm (2.68"):122 mm (4.80") ratio in the basic setting between the outward and rebound mode.

Real-wheel suspension incorporates a high-tech gas pressure spring strut with travel-dependent damping (TDD) and infinite hydraulic adjustment of the spring base by means of a hand-wheel. The damping effect in the outward mode is manually adjustable.

The travel-dependent damping principle was introduced by BMW Motorrad for the first time in 2002 on the R 1150 GS Adventure, providing a progressive damping effect as a function of spring travel. The machine therefore responds smoothly and comfortably to even the smallest bumps on the road, while nevertheless offering adequate potential for rough terrain with hard jolts and deep holes in the surface.

Spring travel at the rear is 200 mm or 7.87", with positive (inward stroke) versus negative (rebound) spring travel being increased over the former model to a new ratio of 135 mm (5.31"):65 mm (2.56") in the basic setting.

Wheels and tyres – offering a free choice of cast or cross-spoke wheels for the first time.

The lucky purchaser of the new R 1200 GS has the choice of either high-strength cast light-alloy wheels or BMW's well-known cross-spoke wheels measuring 2.50 x 19" at the front and 4.00 x 17" at the rear and running on 110/80-19" and, respectively 150/70-17" tyres.

Developed brand-new especially for the R 1200 GS, the cast light-alloy wheels with five double spokes are both stable and light. And while, at 0.1 kg, the reduction in weight at the front versus the spoke wheel is virtually negligible, weight reduction at the rear is a significant 1.6 kg, down by 12 per cent.

A big advantage of cast wheels is that they retain their excellent running smoothness and circular geometry throughout a long running life and are easier to clean. Clearly, this makes them first choice for riding on roads and untarred tracks.

Benefitting from their special design and configuration, the cast wheels on the R 1200 GS are likewise fully suited for moderate offroad conditions. Gravel tracks, nature trails and the usual offroad tracks to be found all over the world are no problem with these wheels as long as the "normal" rider maintains a moderate style of riding observing the elementary rules. In practice, therefore, cast wheels reach their limit only when exposed to very substantial loads over a long period, for example on extreme tracks, at high offroad speed, and when jumping on rough terrain with violent bumps and jolts.

The ambitious offroad rider using his R 1200 GS mainly off the beaten track and often mastering rough terrain at high speeds, should therefore opt for BMW's proven cross-spoke wheels, which are naturally also a good alternative for the rider not keen on cast wheels on his enduro. As before, the particular arrangement of the cross spokes also allows the use of tubeless tyres and the spokes can be replaced individually.

Brakes – high-performance EVO brake and Integral ABS.

The R 1200 GS is fitted with BMW's well-known EVO brake system, which has already proven its benefits such as maximum stopping power under minimum manual force on the R 1150 GS and other BMW machines. Brake disc diameter is 305 mm or 12.00" at the front and 265 mm or 10.43" at the rear.

As an option at extra cost, the R 1200 GS is also available with BMW Integral ABS already well-known on the former model. Complete with on-demand deactivation when riding offroad, Integral ABS also features a semi-integral function with the handbrake lever activating both brakes on the front and rear wheel. In the conventional mode, by contrast, the footbrake lever acts only on the rear wheel brake for precise application of the rear brake alone under specific conditions in very tight bends and on rough terrain.

The steel-clad brake lines, finally, not only look good but also offer a slight decrease in weight and ensure an even more stable pressure point.

Innovations in the on-board network – the BMW Motorcycle Single-Wire System (SWS).

Yet another special feature of the R 1200 GS is the all-new on-board electric system. The term **Single-Wire System** describes a highly innovative on-board network using electronics and CAN-bus technology (Controller Area Network) to offer functions and features never seen before: Reducing the number and length of cables required, this network offers a much wider range of functions than a conventional on-board network, information being transmitted along just one single path (hence “single-wire”) as opposed to the double-wire system otherwise required.

Apart from the wide range of functions, the main advantages of this intelligent combination of electric and electronics are the lighter wiring harness, substantial resistance to interference, and the complete range of diagnostic functions. A further point is that the system may be flexibly expanded by simple updates.

The basic principle of the single-wire system is to connect all control units, sensors, and power-consuming items via one single, common wire in order to form a complete network transmitting all signals regardless of their subsequent function. In other words, all information is readily available at all times within this network for all the components attached.

Signals are assigned and transmitted to the respective power-consuming item at junction points in the electronic system of each control unit. Here the signals/data are processed and then used to activate the functions desired in the respective power consumer. This eliminates the need for elaborate cables otherwise required for each function operating through a separate wire, thus reducing potential effects and errors in a conventional on-board network otherwise resulting from the large number of cables. Clearly, this is an important factor contributing to the system’s high standard of reliability.

All control units are connected to one another, thus being able to communicate directly and exchange data in a bi-directional mode. This allows simple and comprehensive diagnosis of the overall system from one central point, the electronics incorporating suitable programs in order to filter out unimportant data and interference signals within a defined tolerance, thus making the system less sensitive to electromagnetic disturbance.

In all, the new R 1200 GS comes in standard trim with three control units (the cluster instrument also representing a control unit of its own). The control unit for the Digital Motor Electronics (BMS-K) is not only responsible for the engine management already described, but also transmits all data to the central

diagnostic system. Central Suspension Electronics (CSE), in turn, serves to mastermind the electrical units and functions not specific to the engine. And if the motorcycle is fitted with Integral ABS and an anti-theft warning system as an option, the control units are also integrated in the network.

There is no need for conventional fuses at any point throughout the on-board network, the electronic “brain” simply switching off the function involved in the event of a short-circuit or malfunction, subsequent diagnosis serving to quickly trace and remedy the defect. And since the other functions are not affected in such a case, the network philosophy featured on the R 1200 GS again offers further advantages in terms of reliability and failsafe operation.

The control units also provide relay functions, only the starter being controlled via a conventional relay.

The electrical system on the R 1200 GS is supplied with power by a low-weight alternator developing 600 W at 40 Amps. The maintenance-free battery has a capacity of 14 Ah.

After 20 years of experience in electronic engine management and 15 years of experience with ABS technology, BMW Motorrad, introducing this new on-board network, has taken its next innovative step into a successful future.

Electronic immobiliser for optimum security.

To ensure optimum security at all times, the R 1200 GS comes with an electronic immobiliser naturally fitted as standard. Controlled by a transponder in the key, the immobiliser offers the very best in anti-theft security, maintaining the same high level to be found in BMW cars.

As soon as the rider inserts the key and switches on the ignition, a chip within the key communicates with the electronic immobiliser integrated in the Digital Motor Electronics via the ring aerial integrated in the ignition lock. This allows the systems to exchange and compare the coded chip data, on the one hand, and the electronic immobiliser data, on the other. After confirming that the data and signals comply with one another, the engine control unit will release the ignition and fuel injection, allowing the rider to start the engine. This technology is the best and safest immobiliser system currently available worldwide.

New instrument cluster in digital technology.

The new on-board electronic system featured on the R 1200 GS allows the introduction of a high-tech, extra-light instrument cluster based completely on digital technology. Incorporating the speedometer, rev counter and the Info Flatscreen Display, the instrument cluster replaces the former Rider Information Display, providing permanent information on the oil temperature, fuel level, remaining range on the fuel in the tank, the time of day, and the gear currently in mesh.

Both overall and trip mileage are presented on demand, and any interference or defects are shown on the screen as a printed message. The entire instrument unit is automatically illuminated as soon as the weather gets dark, with precise control by a photoelectric cell.

Electric switches.

Both the switches and controls are new. While the basic arrangement of the switches and BMW's logic for operating the direction indicators have both been retained, the switches are now even easier to use and reach, and come in even clearer, more distinctive design.

Body and design – superior function combined with clear, distinctive shapes.

Numerous motorcycle components form a close link of function and looks at the outside, much more so than on a car. The fuel tank, for example, is not just a container for fuel, but also a highly significant design feature crucial through its shape to the rider's seating position and the overall look of the motorcycle.

The same applies to the front fairing together with the windshield not only protecting the rider, but also – in conjunction with the headlight – giving the entire motorcycle its special “face” and characterising the look of the machine also in the front side area.

Using BMW motorcycle language, the fairing components, the fuel tank as well as other function and control elements are jointly referred to as the “body” of the motorcycle.

In its overall design and look, the R 1200 GS stands for dynamism, agility and lightness combined with the robustness typical of an offroader. Clearly structured and contoured surfaces create a feeling of tension and excitement, interacting to provide clear and harmonious lines. Various surfaces finished in plastic, paint and aluminium are assigned to specific functions, combining elegance and value with the ruggedness rightly expected of an enduro.

All visible technical components are included in the design of the machine, the delicate structure and light character of the rear subframe being enhanced and accentuated by the silver paintwork. The slightly curved, oval form of the Paralever swinging arm, finally, combines superior stiffness with a slender and dynamic look all in one.

The colour scheme – aesthetic, individual and full of style.

The colour scheme offers a perfect blend of diversity and aesthetic style, setting unique accents in the process. And with the owner being able to freely combine the colour of the paintwork with that of the seat and side covers, the connoisseur obviously has a wide range of choice.

The three basic colours are elegant and classic Ocean Blue metallic and two special metallisée Rock Red and Desert Yellow non-metallic colour schemes both highlighting the sporting character of the R 1200 GS. Two seat colours (Light Grey and Black) as well as two different colours on the tank side cover (Granite Grey and Black, soft paint) provide a total of 12 different combinations, each giving the motorcycle its own particular character.

Front fairing with adjustable windshield.

Through the functions they comprise, the components on a motorcycle also vary in design. Seen from the front, the fairing, for example, is a typical, striking and distinctive sign of character giving the GS its particular identity. And at the same time this component serves as the air guide for the oil cooler.

The new BMW R 1200 GS provides a modern rendition of the design features already boasted by the former model around the headlight. Indeed, the all-new, asymmetric dual headlight unit with the low and high beams varying in diameter gives the GS its characteristic "face". At the same time the reflectors in free-form technology as well as the clear glass cover make it quite obvious from the start that the entire headlight unit is brand-new. The oval design of the reflectors is indeed not only up-to-date, but also enhances illumination of the road ahead thanks to the large light outlets.

The windshield adjusts to five different angles without requiring any tools in the process, offering riders of different size optimum protection from wind and weather through its design alone. The two plastic side covers right and left at the side of the tank, in turn, come off easily by means of rapid catches.

Plastic tank with side covers.

The 20-litre fuel tank on the R 1200 GS is made of special, extra-light and impact-proof plastic. Two side covers made of thin aluminium and a painted top cover give the tank its special shape and look. Appropriately slender towards the rear, the tank offers good knee and leg support also when riding offroad whenever the rider is standing upright on the footrests.

The seat – ergonomic design and greater variability of seat height.

Maintaining BMW's usual standard, the new two-piece double seat offers both the rider and passenger ample space. The seat is not only available in two colours – Grey and Black – but also adjusts to two different height levels for the rider (840 mm and, respectively, 860 mm/33.1" and, respectively, 33.8'). And with a higher (+30 mm/1.18') and lower (–30 mm) seat also being available as special equipment, the customer is able to choose among four different height levels ranging from 810 mm (31.9') to 890 mm (35.0'), thus benefitting from unprecedented variability and freedom of choice.

In determining the ideal seat height and contour on the R 1200 GS, BMW's engineers and designers have applied a new dimensional criterion for the first time: the rider's step length. Forming the entire distance between two resting points of the rider's feet (measured across the inner length of his legs), this criterion considers not only the absolute, geometric height of the rider's seat, but also its shape and width throughout the relevant area at the front. Even where geometric seat height is the same as on the former model (840 mm/33.1" and, respectively 860 mm/33.8"), this new seat design significantly improves the rider's ground contact while keeping his knee bending angle when riding within comfortable limits.

Luggage rack and removable passenger seat:

Carefully conceived stowage options even for bulky luggage.

Made of stable but light plastic, the luggage rack on the R 1200 GS is all-new in design and offers adequate storage space for additional luggage easy to fasten and transport safely thanks to the lashing points. A further option is to fit a topcase, and the plastic cover beneath the removable passenger seat serving as a flat loading area at the same level as the top edges of the case is both functional and practical all in one. Fitting the cases available as special equipment here, the rider has lots of space for additional baggage, once again with integrated lashing points for optimum security.

Ergonomic handlebar and handle design.

Made of thin-walled steel tubes, the strong and stylish handlebar easily copes with the heaviest loads and is tapered at each end. Weighing only slightly more than an aluminium handlebar, a steel handlebar is much less prone to damage should the machine fall over to the side (for example on offroad terrain) and allows emergency repairs. A further advantage of the steel handlebar is the lower thermal conductivity of steel retaining the heat where it belongs when the machine is fitted with heated handles available as an option.

The hand levers for operating the clutch and brakes have been optimised for perfect ergonomics and are adjustable in their span. At the same time the diameter of the handles has been reduced to provide an even better grip.

Optional extras and special equipment – cases variable in size and a wide range of customisation features.

A complete systems supplier by tradition, BMW Motorrad has developed a wide range of customised extras and special equipment for the new R 1200 GS, offering the owner the very best in individual choice. Optional extras are fitted directly at the factory in the production process in Berlin. Special equipment, in turn, is fitted by the BMW motorcycle dealer.

Optional extras.

- BMW Motorcycle Integral ABS (semi-integral and with on-demand deactivation).
- Cross-spoke wheels.
- Heated handles.
- Hand protectors.
- Case supports.
- Anti-theft warning system.

Special equipment.

- High rider's seat (+30 mm/1.18" versus standard seat), adjustable (max seat height 890 mm/35.0').
- Low rider's seat (-30 mm/1.18" versus standard seat), adjustable (lowest seat height 810 mm/31.9').
- Case supports.
- Cases variable in size by single-lever control.
- Mounting plate for topcase.
- Topcase.
- Inner bags for cases/topcase.
- Water-tight tank bag.
- Hand protectors.
- Small cylinder protection hoops.
- Large cylinder protection hoops.
- Anti-theft warning system (also available as an optional extra).
- Additional power socket.
- BMW Motorcycle Navigator.

Both the cases and the topcase are an all-new development. A unique feature is the sophisticated, single-lever control function for adjusting the volume of the cases easily and conveniently: Both the cases and the topcase may be varied in size by 9 litres, allowing the rider to flexibly adjust the luggage system to individual space requirements and reduce the width of the cases as well as the height of the topcase when taking along less luggage.

The left-hand case on the muffler side offers maximum capacity of 37.5 litres, the right-hand case holds up to 46 litres. With the topcase also offering capacity of 46 litres, maximum storage capacity is almost 130 litres.

2. History of the GS Boxer.



The starting point in developing the GS in the late '70s was BMW's support of various teams in offroad events such as the famous Six Days. And indeed, offroad sports activities of this kind have a long tradition with BMW, extending all the way back to the '30s, BMW Boxer motorcycles successfully entering the most challenging offroad events time and again.

The final touch came with by BMW's victory in the German Offroad Championship in 1979, some enthusiasts at BMW Motorrad GmbH, as BMW's Motorcycle Division was officially called at the time, advising Management to develop a series machine for homologation based on the experience gained with competition models. Tests with the first prototypes were an immediate success right from the start, convincing BMW Motorrad to begin the series development process.

The world's two-cylinder large enduro entered a market in 1980, which up to that time had consisted exclusively of single-cylinder models. Displacing 800 cc and featuring both a driveshaft and a single swinging arm, the R 80 G/S was a genuine sensation. Indeed, this new machine opened up a brand-new, previously untapped segment – the segment of large capacity, all-round touring enduros.

The R 80 G/S quickly became the ideal motorcycle for the committed globe-trotter, enthusiasts all over the world soon learning to appreciate the power and performance reserves, the long-distance comfort and the often surprising offroad qualities of this touring enduro. Superior riding pleasure on the road was ensured by the relatively high level of power, superior torque all the way from low engine speeds, equally superior riding stability, and excellent handling.

BMW offroad machines participated right from the start in the long-distance Paris-Dakar Rally taking the riders all the way to Senegal in West Africa. And in its third try in 1981 the Boxer with its efficient cooling ensured by the wind rushing by, a low centre of gravity and superior ease of maintenance thanks to its driveshaft finally made its way right to the top, French desert specialist Hubert Auriol winning the motorcycle category and repeating his success two years later in 1983.

Still based on series models as before, BMW's 1,000-cc two-cylinders also brought home the title in 1984 and 1985, former World Motocross Champion Gaston Rahier from Belgium leaving the competition far behind.

Launched in 1988, the R 100 GS raised the outstanding qualities of BMW's offroaders to an even higher standard. Indeed, this was the largest enduro in the world at its time. And with worldwide sales amounting to 69,000 units, the R 80/R 100 GS was also a huge success in the market.

Introduced in 1994, the GS models powered by a four-valve engine brand-new at the time have become an even greater success in the meantime:

The R 1150 GS, for example, introduced into the market in autumn 1999 and benefitting from the additional support of the R 1150 GS Adventure since autumn 2002, was once again the best-selling machine in Germany in 2003, beating the competition by far. And it almost goes without saying that the R 1150 GS continued this success in 2003, once again outselling all other motorcycles in the German market by far.

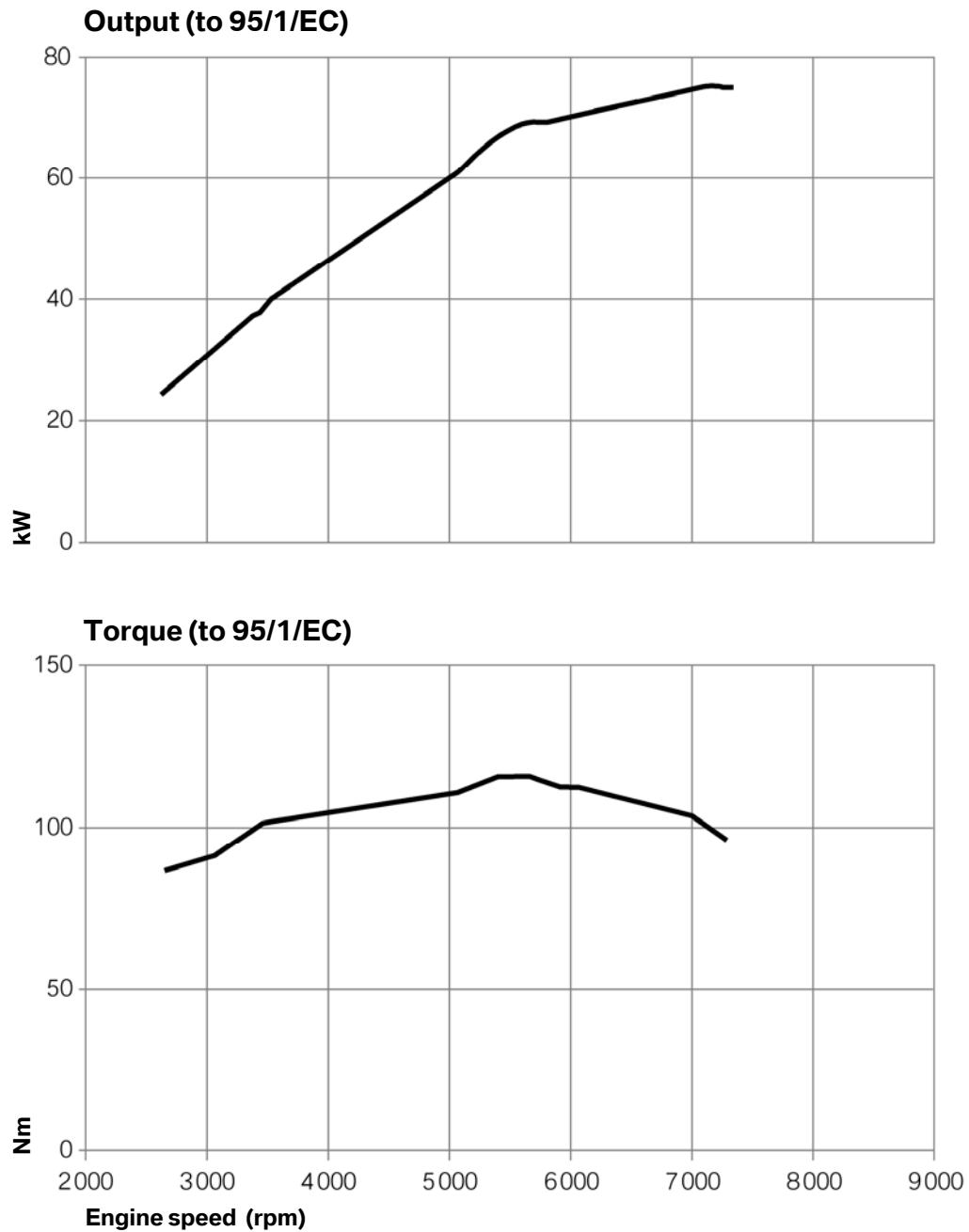
Since 1980 BMW Motorrad has sold approximately 170,000 units of the GS Boxer to customers the world over.

Like its predecessor, the new R 1200 GS, with its "GS" (Gelände/Straße or Offroad/Road) orientation, offers a wide range of qualities and practical values: Riding the R 1200 GS on moderate terrain is easy and safe, and the experienced motorcyclist is also able to master very tough offroad conditions. On the road, in turn, the GS stands out through its impressive handling ensured by the extremely stable and comfortable suspension together with large power reserves making this unique machine ideal for dynamic riding on winding country roads and mountain passes. And with its effective windshield, the R 1200 GS enables the rider to cover even long stretches on the motorway without undue pressure. So that in practice the R 1200 GS is also ideal as a long-distance travelling machine on the road.

All GS models since 1980 at a glance:

1980–1987	R 80 G/S 797 cc ohv 37 kW (50 bhp)
1988–1990	R 65 GS 649 cc ohv 20 kW (27 bhp)
1996	R 80 G/S Basic 797 cc ohv 37 kW (50 bhp)
1987–1996	R 100 GS 980 cc ohv 44 kW (60 bhp)
1987–1996	R 80 GS 797 cc ohv 37 kW (50 bhp)
1990–1995	R 100 GS Paris-Dakar 980 cc ohv 44 kW (60 bhp)
1993–1999	R 1100 GS 1,085 cc hc 59 kW (80 bhp)
1999–2000	R 850 GS 848 cc hc 51 kW (70 bhp) or 25 kW (34 bhp)
1999–2003	R 1150 GS 1,130 cc hc 63 kW (85 bhp)
2002	R 1150 GS Adventure 1,130 cc hc 63 kW (85 bhp)
2004	R 1200 GS 1,170 cc hc 72 kW (98 bhp)

3. Power and Torque.



4. BMW R 1200 GS Specifications.

		R 1200 GS (72 kW)*	R 1200 GS (74 kW)
Engine			
Capacity	cc	1,170	
Bore/stroke	mm	101/73	
Max output	kW/bhp	72/98	74/100
at	rpm	7,000	
Max torque	Nm/lb-ft	115/85	
At	rpm	5,500	
Configuration		Flat-twin	
No of cyls		2	
Compression ratio/fuel grade		11.0/premium	
Valve/gas control		HC (high camshaft)	
Valves per cylinder		4	
Intake/outlet dia	mm	36/31	
Fuel supply		BMS-K	
Electrical system			
Alternator	W	600	
Battery	V/Ah	12V/14Ah maintenance-free	
Headlight	W	H7	
Starter	kW	1.1	
Power transmission/gearbox			
Clutch		Single-plate dry clutch, dia 180 mm	
Gearbox		Six-speed manual	
Primary transmission ratio		1.823	
Gear ratios	I	2.277	
	II	1.583	
	III	1.259	
	IV	1.033	
	V	0.903	
	VI	0.805	
Final drive		Driveshaft	
Transmission ratio		2.28	
Running gear			
Type of frame		Tubular spaceframe, engine load-bearing	
Front wheel drive		BMW Telelever	
Rear wheel drive		BMW Paralever	
Clutch		Single-plate dry clutch, 180 mm dia	
Type of frame		Tubular spaceframe, load-bearing engine	
Suspension, front/rear	mm	190/200	
Castor	mm	110	
Wheelbase	mm	1,519	
Steering head angle	°	62.9	
Brakes	front rear	Double disc brake, dia 305 mm Single disc brake, dia 265 mm Optional BMW Integral ABS (partly integral)	
Wheels		Cast, cross-spoke wheels as an option	
	front	2.5 x 19	
	rear	4.0 x 17	
Tyres	front	110/80 H 19 TL	
	rear	150/70 H 17 TL	
Dimensions and weights			
Length, overall	mm	2,210	
Width, overall, with mirrors	mm	915	
Handlebar width without mirrors	mm	871	
Seat height	mm	840/860	
Weight, unladen and with full tank	kg	225	
Max permissible weight	kg	425	
Fuel tank	ltr	20	
Performance data			
Fuel consumption			
90 km/h	ltr/100 km	4.3	
120 km/h	ltr/100 km	5.5	
Acceleration			
0–100 km/h	sec	3.4	
Standing-start km	sec	24.7	
Top speed	Km/h	205	208

* Available in Germany only.

5. R 1200 GS Colour Scheme.



Model	Colour	Seat	Side cover
R 1200 GS	Desert Yellow, non-metallic, metallisée	Light Grey or Black	Granite Grey metallic or Black soft paint
	Rock Red, non-metallic, metallisée	Light Grey or Black	Granite Grey metallic or Black soft paint
	Ocean Blue metallic	Light Grey or Black	Granite Grey metallic or Black soft paint