

The all-new BMW R 1250 GS



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1. Overall concept. (Short version)



The all-new BMW R 1250 GS – the fascination of travel and touring in a new dimension of engine power.

For more than 35 years, the boxer engine in the BMW Motorrad GS model has stood for distinctive, powerful and reliable propulsion when it comes to setting off on an extended tour or a long-distance journey – or simply enjoying the satisfying pleasure of a short weekend trip. For more than 25 years, BMW Motorrad has used 4-valve technology in this connection, combined with electronic fuel injection and closed-loop catalytic converter technology in order to achieve the best possible power and torque delivery, efficiency and environmental compatibility.

Further advanced boxer engine with BMW ShiftCam Technology for an additional increase in power across the entire engine speed range, reduced emission and fuel consumption levels, optimised running smoothness and refinement.

With the extensively further advanced boxer engine, the all-new R 1250 GS not only achieves a whole new level of power and torque, it is also possible to significantly optimise refinement and running smoothness – especially within the lower engine speed range. What is more, the new engine offers improved emission and fuel consumption levels as well as a particularly satisfying sound. For this purpose, BMW ShiftCam Technology has been used for the first time in the serial production of BMW Motorrad engines: this enables variation of the valve timings and valve stroke on the intake side. In addition, the intake camshafts are designed for asynchronous opening of the two intake valves, resulting in enhanced swirl of the fresh, incoming mixture and therefore more effective combustion. Other technical changes to the engine relate to the camshaft drive – now taken care of by a toothed chain (previously a roller chain) – an optimised oil supply, twin-jet injection valves and a new exhaust system.

Two riding modes, ASC and Hill Start Control as standard.

There are two riding modes available as standard in order to be able to adapt the motorcycle to individual rider preferences. The standard Automatic Stability Control ASC ensures a high level of riding safety due to the best possible traction. The set-off assistant Hill Start Control is likewise a standard feature in both models, enabling convenient set-off on slopes.

Riding Modes Pro, featuring additional riding modes, Dynamic Traction Control DTC, ABS Pro, Hill Start Control Pro and Dynamic Brake Assistant DBC (new), available as an optional equipment item ex works.

"Riding Modes Pro" is now available as an optional equipment item, featuring the additional riding mode "Dynamic", Dynamic Traction Control DTC. DTC enables even more efficient and safe acceleration, especially in banking position. ABS Pro (part of Riding Modes Pro in the R 1250 GS) offers even greater safety when braking, even in banking position. The new Dynamic Brake Control DBC provides additional safety when braking, also in difficult situations, by avoiding unintentional accelerator activation. By means of intervention in the engine control, drive torque is reduced during braking so as to make full use of the braking power at the rear wheel. This keeps the motorcycle stable and shortens the braking distance.

LED headlamp for the R 1250 GS as standard and LED daytime riding light for both models as an ex works optional equipment item.

The all-new R 1250 GS now features the LED headlamp as standard. In addition to this, the LED daytime riding light is available as an optional equipment item for the R 1250 GS, which has halogen headlamps.

Connectivity: multifunctional instrument cluster with 6.5-inch full-colour TFT screen and numerous features as standard in the R 1250 GS.

The all-new R 1250 GS now has the equipment feature Connectivity as standard including a 6.5-inch full-colour TFT screen. In conjunction with the standard BMW Motorrad Multi-Controller, this means the rider can access vehicle and connectivity functions particularly swiftly and conveniently.

Intelligent Emergency Call as an ex works option.

Ensuring the fastest possible assistance in the event of an accident or in situations of emergency and danger can save people's lives. The optional equipment item Intelligent Emergency Call summons assistance to the scene as quickly as possible. As before, this feature can be ordered for the all-new R 1250 GS.

New attractive colours and style variants.

The all-new R 1250 GS showcases its travel and off-road prowess in two modern basic finishes and two striking style variants.

An overview of the highlights of the all-new BMW R 1250 GS:

- Further developed boxer engine with BMW ShiftCam Technology for variation of the valve timings and valve stroke on the intake side.
- Even more power across the entire engine speed range, optimised fuel consumption and emission levels, increased running smoothness and refinement.
- Increased output and torque: 100 kW (136 hp) at 7 750 rpm and 143 Nm at 6 250 rpm
- Capacity of 1254 cc
- Asynchronous valve opening on the intake side for optimised swirl and therefore more effective combustion.

- Camshaft drive via toothed chain
- Optimised oil supply and piston base cooling.
- Knock sensor system for optimised travel suitability.
- Latest generation of BMS-O engine control and use of twin-jet injection valves for even more effective carburetion.
- New exhaust system for optimum performance characteristics.
- Two riding modes, ASC and Hill Start Control as standard.
- Riding Modes Pro, featuring additional riding modes, Dynamic Traction Control DTC, ABS Pro, Hill Start Control Pro and Dynamic Brake Assistant DBC, available as an optional equipment item ex works.

Electronic suspension Dynamic ESA “Next Generation” with fully automatic load compensation.

- In addition to standard adjustability of seat height (exception: HP style for the R 1250 GS), wide range of seat height variants ex works.
- LED headlamp for the R 1250 GS as standard and LED daytime riding light as an ex works optional equipment item.

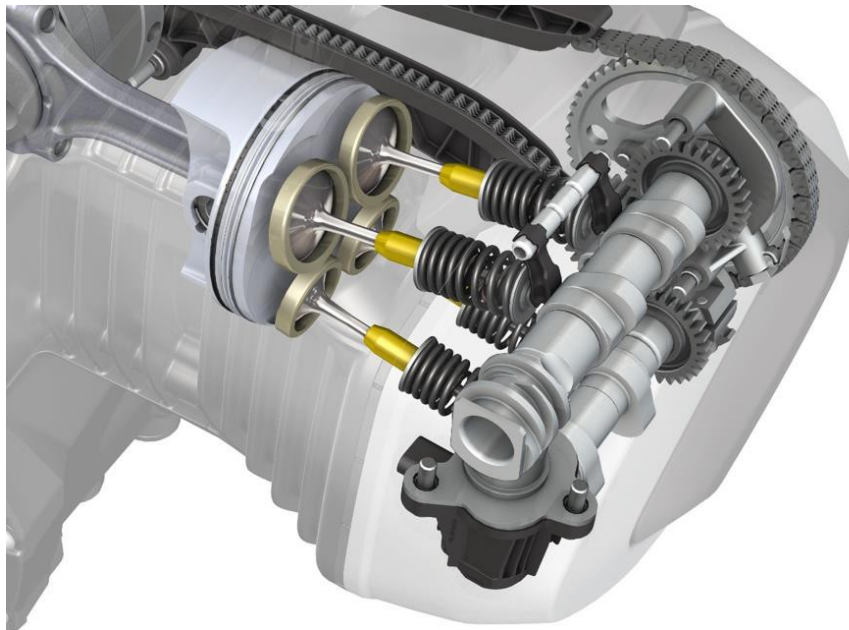
Connectivity: multifunctional instrument cluster with 6.5-inch full-colour TFT screen and numerous features as standard in the R 1250 GS.

- Intelligent Emergency Call as an ex works option.
- Extended range of optional equipment items and BMW Motorrad Accessories.

- The all-new R 1250 GS: travel and off-road prowess in two modern basic finishes and two striking style variants.



2. Technology.



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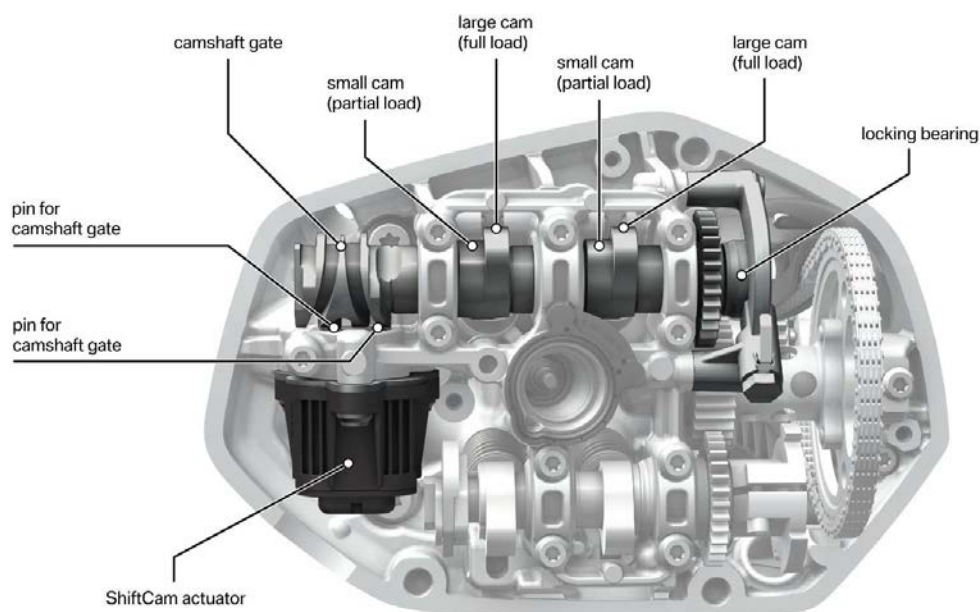
Boxer engine with new top levels for output, torque, rideability and refinement.

In the latest generation, the boxer engine has a capacity of 1254 cc. The ratio between bore and stroke is 102.5 to 76 mm. It has an output of 100 kW (136 hp) at 7 750 rpm and develops a maximum torque of 143 Nm at 6 250 rpm. This engine is the most powerful BMW boxer engine ever to be manufactured in serial production.

At its latest stage of development too, the boxer engine uses the well-established system of air/liquid cooling. So-called precision cooling means that the cooling fluid flows through the engine elements that are more heavily exposed to heat – namely the two cylinder heads and parts of the cylinders. Heat is dissipated via two radiators positioned at the left and right of the front vehicle section.

BMW ShiftCam Technology for increased power across the entire engine speed range, enhanced running smoothness and refinement as well as further optimised fuel consumption and emission levels.

The objective in developing the new boxer engine in the R 1250 GS was to enhance the output and torque figures. This also involves a significant increase in refinement and running smoothness as well as optimised emission and fuel consumption levels.



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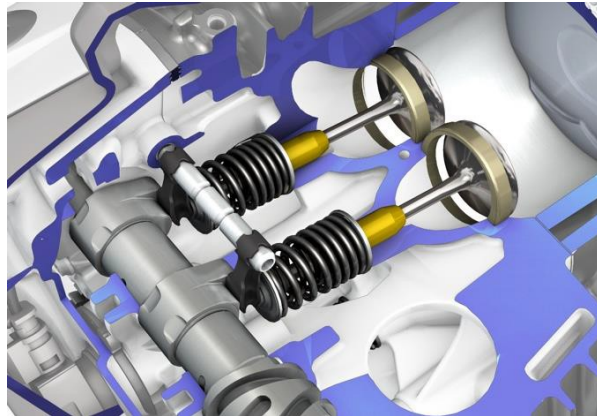
It was possible to achieve these enhancements by means of BMW ShiftCam Technology. This is a technology that is completely new to BMW motorcycles: its function is to vary the valve timings and valve stroke on the intake side. The core of the technology is a single-unit shift camshaft with two cams per valve to be activated: one partial-load cam and one full-load cam, each featuring cam geometry in optimised design. While the partial-load cam has been configured to ensure optimised fuel consumption and refinement, the full-load cam is designed for optimised output.

Axial shift of the intake camshaft means the intake valves are activated by either the partial-load or the full-load cam, depending on load and engine speed. The axial shift of the intake camshaft and the use of the partial-load or full-load cam are effected by means of a shifting gate on the camshaft and an electronic actuator which intervenes at this point.

Variation of the intake valve stroke and asynchronous valve opening.

The varied configuration of the cam geometry also enables variation of the intake valve stroke. While the full-load cam provides maximum valve stroke, the partial-load cam delivers reduced valve stroke. There is also a difference between the intake cams for the left and right-hand intake valve in stroke and angular position. This phase shift means that the two intake valves are opened to different degrees and on a time-staggered basis.

The effect of this phase shift is to create a swirl and therefore greater agitation of the fuel-air mixture flowing into the combustion chamber. This results in particularly effective combustion and better utilisation of the fuel as a result.



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The benefits of BMW ShiftCam Technology:

- Increased torque and pulling power across the entire engine speed range.
- Enhanced refinement and more even engine running when travelling at a constant speed due to optimum configuration of the partial-load cam geometry for the lower load range and engine speed range.
- Significant peak output to 100 kW (136 hp)
- Low load change loss in the partial load range.
- Low idling engine speed by 100 rpm.
- Less exhaust emissions and optimised sound.
- Less of fuel consumption

Even more supreme ridability due to increased torque as well as tangibly improved running smoothness and refinement.

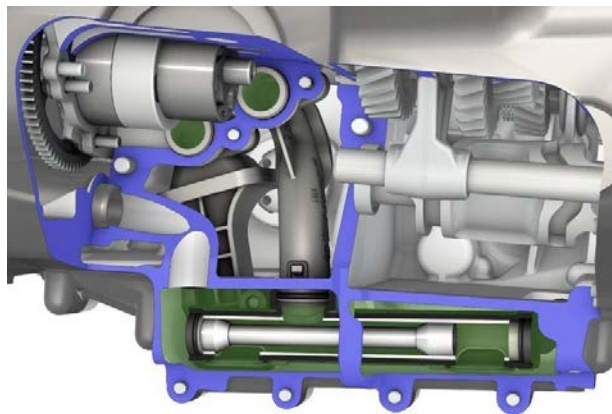
In practical terms, BMW ShiftCam Technology results in an even further significant improvement in ridability for the all-new R 1250 GS. In the range from 2 000 to 8 250 rpm, for example, the level of torque available is 110 Nm. Within the range that is especially relevant in terms of riding dynamics, namely 3 500 to 7 750 rpm, the impressive level of over 120 Nm is now available. This gives the all-new R 1250 GS even greater supremacy and pulling power, combining absolutely superior power delivery with remarkable top performance – whether riding alone or with a passenger, on winding country roads or covering long stages of a journey at a high average speed. In short: never before has a boxer engine provided this level of riding fun and refinement.

Cylinder head with vertical flow and camshaft drive now by means of toothed chain. Optimised oil supply and piston base cooling.

The engine of the all-new BMW R 1250 GS also features vertical flow. The advantage here is that the configuration of the intake channel no longer depends on the camshaft control, so it was possible to realise identical intake lengths for both cylinder sides. What is more, the fuel injector is now arranged so that the fuel is injected as directly as possible in front of the intake valves for optimum carburetion.

The two camshafts per cylinder side are powered by a chain running in the shaft behind the cylinders (on the right-hand side of the engine via the counterbalance shaft and to the left via the crankshaft). The timing chain drives an intermediate shaft between the intake and exhaust camshaft and it is from here that power is transmitted to the camshafts via spur gear pairs. The control chain is a toothed chain with the aim of further reducing running noise. The four valves are arranged at close angles to one another in order to achieve an optimum combustion chamber shape. The valve angle is 8 degrees on the intake side and 10 degrees on the exhaust side, while the disc diameters of the valves are 40 mm on the intake side and 34 mm on the exhaust side. The valve shaft diameter is 5.5 mm. The valves are operated via light, speed- resistant rocker arms, the design of which was derived from the high- performance 4-cylinder engine of the BMW S 1000 RR. The valve clearance settings are made by means of replaceable shims.

The increase in output and torque and therefore riding dynamics as a whole also involves two back-up measures to ensure maximum operating reliability: the two pistons have base cooling using splash oil and the lubrication system has been fitted with variable oil intake.



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By means of a shifting piston in the intake area of the oil sump, the latter ensures optimum oil supply in all riding states.

Knock sensor system for optimised travel suitability. BMS-O engine control and twin-jet injection valves for even more effective carburetion.

The all-new R 1250 GS has a knock sensor system in the form of two knock sensors. This allows the use of fuels with a rating of less than RON 95 – a particular advantage when travelling in the more remote corners of the planet. The all-new R 1250 GS is also fitted with a new digital engine control, the so-called BMS-O. Its main features are fully sequential injection, a compact layout and low weight. Carburetion is carried out by an electronic fuel injection system via throttle bodies with an opening width of 52 mm. Injection is via new twin-jet injection valves that support even greater refinement and further improved emission levels.

Counterbalance shaft for perfect mechanical running smoothness.

The new engine also has a counterbalance shaft which runs at crankshaft rotation speed so as to eliminate unwanted vibrations. The counterbalance shaft is configured as a hollow intermediate shaft, inside which the clutch shaft runs at the same time. This ensures that the new engine in the R 1250 GS runs comfortably and with low levels of vibration across the entire engine speed range. Nonetheless, the essential earthy boxer characteristics are still preserved.

Gearbox integrated in engine housing, including wet clutch with anti-hopping function.

The gearbox and clutch are integrated in the engine housing in the new boxer engine, too. This provides benefits in particular in terms of overall weight due to the omission of numerous bolt connections and sealing surfaces, but also in terms of the torsional response of the unit as a whole. In

addition to a design that saves both space and weight, this concept means that no additional gearbox volume is required.

Power transmission to the 6-speed gearbox, which has been further optimised in terms of gear shifting, is via a multi-plate wet clutch with eight friction discs. The clutch system is fitted with an anti-hopping mechanism. With this new drive generation, BMW Motorrad has thus especially addressed the wishes of riders with sporty ambitions who prefer country roads. The brake torque of the engine is now passed to the rear wheel at a reduced level during coasting. This prevents brief blocking or hopping of the rear wheel due to the dynamic wheel load distribution when applying the brakes heavily and changing down at the same time. In this way, the motorcycle remains stable and safely controllable during the braking phase.

New exhaust system for optimum performance characteristics.

Made completely out of stainless steel, the exhaust system of the all-new R 1250 GS is designed entirely for optimum output and torque in conjunction with BMW ShiftCam Technology and works according to the 2-in-1 principle. In this development area, a homogeneous output and torque curve and thus excellent rideability were once again regarded as requirements for supreme performance on country roads, off-road riding and extended touring activity.

The two manifold tubes and the interference pipe were redesigned in terms of shaping, length and diameter. Exhaust gas purification is taken care of by a closed-loop catalytic converter controlled by an oxygen sensor. In this way, the all-new R 1250 GS meets current exhaust standards and are excellently equipped for future requirements.

Two riding modes, ASC and Hill Start Control as standard.

Even in standard trim, the all-new R 1250 GS offers two riding modes for adaptation to individual rider preferences. Here, the standard Automatic Stability Control ASC ensures a high level of riding safety due to excellent traction. What is more, the riding modes "Rain" and "Road" allow adaptation of the bike's properties to most road surface conditions. The set-off assistant Hill Start Control is likewise a standard feature in both models, enabling convenient set-off on slopes.

Riding Modes Pro, featuring additional riding modes, Dynamic Traction Control DTC, ABS Pro, Hill Start Control Pro and Dynamic Brake Assistant DBC, available as an optional equipment item ex works.

As an optional equipment item ex works, the all-new R 1250 GS can be fitted with the option "Riding Modes Pro", featuring the additional riding mode "Dynamic", Dynamic Traction Control DTC. DTC enables even more efficient and safe acceleration, especially in banking position. The riding mode "Dynamic Pro", and in the R 1250 GS "Enduro Pro", both activated by means of a coded plug, also each have customisation options that allow the character of the motorcycle to be adapted to individual needs, thereby further enhancing the fun of riding.

ABS Pro (part of the optional equipment item Riding Modes Pro in the R 1250 GS) also offers even greater safety when braking, especially in banking position, while Dynamic Brake Control DBC provides the rider with extra support on brake manoeuvres. DBC increases safety when braking, even in difficult situations, by avoiding unintentional accelerator activation. By means of intervention in the engine control, the drive torque is reduced during braking, making full use of the braking power at the rear wheel. This keeps the motorcycle stable and shortens the braking distance. With the dynamic brake light (part of the optional equipment item "Riding Modes Pro" in the R 1250 GS), vehicles to the rear are made more aware of the fact that the motorcycle is decelerating.

The new optional equipment item Hill Start Control Pro goes beyond the functions of a comfort system such as Hill Start Control to facilitate stopping and setting off on a slope. Hill Start Control Pro offers the new additional function Auto HSC. The settings menu allows this additional function to be individualised in such a way that the parking brake is automatically activated on a gradient (greater than +/- 5 %) when the hand or foot brake lever has been activated, shortly after the motorcycle comes to a standstill.

Electronic suspension Dynamic ESA "Next Generation" with fully automatic load compensation.

An even higher level of riding safety, performance and comfort is achieved with the BMW Motorrad Dynamic ESA "Next Generation" (Electronic Suspension Adjustment), the damping automatically adapts to the situation depending on riding state and manoeuvres, and there is also automatic riding position compensation in all load states. In terms of the technical background, signals from the rotational speed sensor and the two travel sensors at the front and rear enable comprehensive data collection and therefore finely tuned adaptation of the motorcycle to riding states. Based on additional parameters, riding states are detected such as compression,

acceleration and deceleration, and these are incorporated in the adaptation of damping forces, both at the rear spring strut and Telelever front wheel control. This adaptation is applied by means of electrically actuated regulation valves within the millisecond range. As a result, optimum damping comfort and a very stable ride response is ensured even in banking position.

Dynamic ESA “Next Generation” is pre-set to the “Road” damping characteristics in the standard set-up of the riding modes “Rain”, “Road” and “Dynamic”. At the press of a button – conveniently positioned on the handlebars so it can even be operated during travel – the rider can switch to the damping characteristics “Dynamic” in the riding modes “Rain” and “Road”, thereby selecting a tighter damping set-up. The tighter damping variant “Dynamic” is pre-set in the riding modes “Dynamic” and “Dynamic Pro”. Meanwhile the riding mode “Enduro” and “Enduro Pro” – additionally available for the R 1250 GS – are configured to include the damper setting “Enduro”, which is geared towards the loose surfaces to be anticipated.



Sports suspension for the R 1250 GS HP as an optional feature.

The sports suspension optionally available for the style variant HP allows the all-new R 1250 GS to be optimised for more ambitious off-road use as before. The increased spring rate (“harder suspension”), longer spring struts and therefore longer spring travel lead to a significant enhancement of ride stability in off-road use, which is especially noticeable over gravel passages. This sports suspension benefits experienced off-road motorcyclists who know when to convert suspension reserves into increased performance without overtaxing the motorcycle or themselves. Heavy and tall riders will appreciate the advantages of this spare capacity due to the tighter suspension set-up, especially when riding off-road. This optional equipment item, only available in conjunction with Dynamic ESA, also includes all the new functions of automatic damping and load compensation.

Wide range of seat height variants.

For the all-new R 1250 GS there are numerous seat height variants available as before – from the low-slung version with low seat (800 mm) through to HP style with sports suspension and Rallye seat (900 mm).

See and be seen even more effectively – LED headlamp for the R 1250 GS as standard and LED daytime riding light as an optional equipment item ex works.

For decades now, BMW Motorrad has been regarded as a frontrunner when it comes to safety in connection with motorcycling. One shining example in the truest sense of the word is the LED headlamp which is now offered as a standard feature of the R 1250 GS. In addition to this, the LED daytime riding light is available as an optional equipment item for the R 1250 GS. The LED headlamp of the R 1250 GS illuminates the road with a hitherto unrivalled clarity, thereby ensuring additional perception in traffic. The light unit consists of two LED units for low and high beam and, in connection with LED daytime riding light as an optional equipment item, four additional LED units for daytime riding light and side light.

Connectivity: multifunctional instrument cluster with 6.5-inch full-colour TFT screen and numerous features as standard in the R 1250 GS.

Even in its standard version the all-new R 1250 GS has the equipment item Connectivity, which now shows the existing instrument cluster in the form of a 6.5-inch full-colour TFT screen. In conjunction with the standard BMW Motorrad Multi-Controller with integrated operation, it gives the rider fast access to vehicle and connectivity functions.

The all-new R 1250 GS has the equipment feature Connectivity as standard including a 6.5-inch full-colour TFT screen. In conjunction with the standard BMW Motorrad Multi-Controller, this means the rider can access vehicle and connectivity functions particularly swiftly and conveniently.

This means it is possible to enjoy the convenience of making a phone call or listening to music during travel. If a smartphone and a helmet with the BMW

Motorrad Communication System are connected via Bluetooth to the TFT screen, for example, the rider can conveniently access media playback and telephone functions. These functions can also be used without the need to install an app. With an active Bluetooth connection to any standard smartphone, the rider can enjoy the pleasures of listening to music during travel. In addition, the freely available BMW Motorrad Connected App offers handy arrow-based navigation suitable for day-to-day use directly via the TFT screen. The BMW Motorrad Connected App can be downloaded free of charge from the Google and Apple app stores. It also comprises attractive additional functions such as route logging and the display of other travel statistics and information. In this way, logged routes can also be shared directly with other motorcyclists via the REVER community. The basic navigation system will be of particular interest to motorcyclists since it enables convenient organisation of day-to-day travel and short trips without the need for additional equipment.

Intelligent Emergency Call as an ex works optional equipment item for further increased safety.

Ensuring the fastest possible assistance in the event of an accident or in situations of emergency and danger can save people's lives. For this reason, BMW Motorrad has developed an eCall system – "Intelligent Emergency Call" – which aims to get help to the scene of the incident as quickly as possible. This system is available as an optional equipment item ex works for the R 1250 GS.

Unrivalled scope of ex works optional equipment items and Original BMW Motorrad Accessories.

BMW Motorrad offers an unprecedented program of optional equipment items and accessories for the R 1250 GS. The range is virtually endless – from the preparation of the navigation unit for operation via Multicontroller through to various ergonomics options and extensive storage concepts.



3. Design and colour concept.

The all-new R 1250 GS: travel and off-road prowess in two modern basic finishes and two striking style variants.

The all-new BMW R 1250 GS conveys its refined character and universal talents with two new colours in the basic version and the style variants Exclusive and HP. The presence of a new power unit is demonstrated by means of newly designed cylinder head covers bearing the inscription "ShiftCam" as well as the pipe ducting of the new exhaust manifold system.

Basic version in Blackstorm metallic and Cosmic Blue metallic:

Each of the finishes Cosmic Blue metallic and Blackstorm metallic give the all-new R 1250 GS a pronounced modern appearance, combining the standard cast wheels in Granite Grey metallic matt with black brake calipers, a black rear frame, a silver main frame, silver handlebars and a silver drivetrain as well as a luggage bridge in White Aluminium matt with trim holder in Nürburg Silver. The Telelever slider tubes anodized in gold emphasise the off-road talents of the all-new R 1250 GS. The two body finishes are to be found on the central fuel tank cover and the front wheel cover. Here, the fuel tank side trim elements in Asphalt Grey metallic provide a touch of contrast. The radiator trim in galvanised plastic adds a quality accentuation, as does the new model inscription.



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R 1250 GS Exclusive:

In the style variant Exclusive and the new colour combination Blackstorm metallic / Night Black, the all-new R 1250 GS blends classic understatement and masculine character with a commanding presence and elegance. The drivetrain coated in black matt provides the perfect counterpart to the main frame in Agate Grey metallic matt as well as the black rear frame and the black anodized tube handlebars. In addition, the trim holder at the front and the luggage bridge are finished in black, thereby adding an appropriate accentuation. Cast wheels in Night Black along with black anodized Telelever slider tubes reinforce the masculine, hands-on character of the all-new R 1250 GS. The body finish Blackstorm metallic is applied to the central fuel tank cover and the front wheel cover. Meanwhile the fuel tank side trim elements in Night Black combined with a graphic make for a fascinating contrast.

The innovative aspirations of the all-new R 1250 GS are underscored by a newly designed radiator trim, in this case made of stainless steel. Brake calipers in gold reinforce the exclusive touch of the all-new R 1250 GS.



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R 1250 GS HP:

In the style version HP the R 1250 GS emphasises its sporty ambitions, dynamically showcasing its off-road expertise as a travel enduro with the colour combination Light White/Racing Blue metallic/Racing Red.



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Light White is to be found on the main frame and in combination with graphics on the fuel tank side trim elements and front wheel cover, while Racing Blue is applied to the central fuel tank cover.

The masculine, robust character of the travel enduro is borne out in

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unit, black Telelever slider tubes and additional elements such as the extended front wheel cover and frame guard. In this colour variant, too, the tube handlebars, front trim holders and luggage bridge are finished in black.

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The all-new R 1250 GS also reflects its enhanced off-road competence with a radiator guard, finely wrought cross-spoke wheels, a radiator trim in stainless steel and golden brake calipers. The all-new R 1250 GS is also given a particularly sporty, agile and active riding look by means of a black rear frame and the Rallye seat in HP colour scheme.

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5. History of the BMW 4-valve boxer engines.



The R 100 RS saw its debut in September 1992, almost exactly 70 years after the R 32 – the first ever BMW motorcycle – and featured a completely reworked boxer engine. While serial production motorcycles with a boxer engine had been mainly air-cooled up to that point, BMW was now branching out into new territory with air/oil cooling.

1992: With the R 1100 RS, it was the first time BMW Motorrad put a 4-valve boxer into serial production.

There were a number of technical reasons why the decision was made to revise the existing design. Increasingly stringent noise limits were forcing motorcycle manufacturers not only to muffle air intake and exhaust noise as efficiently as possible but also to reduce the mechanical noise of the power unit itself to a technologically feasible minimum.

Another technical reason for the change was the increased stability of the engine in conjunction with a higher output. The oil cooling system was significantly more effective, particularly around the cylinder head where heat exposure was at its greatest. What is more, liquid cooling meant the engine was heated more evenly. A particular advantage of oil/air cooling was also to be seen during the cold-run phase: the use of oil as a coolant meant the engine heated up much more quickly than an air-cooled engine. The welcome result of this was reduced wear-and-tear and a longer lifetime.

The new boxer engine in the R 1100 RS had a displacement of 1 085 cc, with a bore of 99 mm and a stroke of 70.5 mm. The peak output was 66 kW (215 hp) at 7 250 rpm. For the first time in a volume-production boxer engine, BMW Motorrad applied four valves per cylinder in this engine. Designed in CIH (camshaft-in-head) configuration, one camshaft per cylinder was activated by means of a timing chain running behind the cylinders powered by a countershaft which was positioned underneath the crankshaft. The cam followers – now very short as compared to the previous design – ensured a much stiffer and thus more speed-resistant valve gear, providing the leeway required for increased output in the future. What is more, this configuration further reduced the level of mechanical noise. At the same time, the existing system of carburetion using a constant depression carburettor was replaced by a modern intake pipe injection system in conjunction with a Bosch Motronic. Together with the oxygen sensor, this now allowed the use of a closed-loop three-way catalytic converter, ensuring

the boxer was well equipped for the years to come in terms of emissions. The 5-speed, 3-stage planetary gear with separate oil supply was flange-mounted in the traditional BMW manner.

The air/oil-cooled 4-valve boxer demonstrated its enormous development potential over a period of 15 years.

This air/oil-cooled engine was developed successively in the course of the next 15 years. Displacement was increased from 1999 onwards to 1 130 cc in the R 1150 models, and from 2004 onwards the displacement volume available was as much as 1 170 cubic centimetres in the R 1200 models. The increase in displacement to 1 170 cc involved a significant reworking of the engine with a view to improving refinement and comfort even further. For this reason, it was the first time a BMW boxer engine was fitted with a counterbalance shaft: this rotated in the opposite direction from that of the crankshaft, virtually entirely eliminating first-order inertia torque by means of two equalizing weights offset by 180 degrees. No BMW boxer engine before had ever run as smoothly as that of the R 1200 models.

Three years after its debut – in autumn 2007 – this power unit underwent technological fine-tuning. Instead of the previous level of 98 hp (72 kW), an output of 77 kW (105 hp) was now available to the R 1200 GS. With maximum torque increased to 8 000 rpm and an even broader engine speed range, it demonstrated even greater dynamic performance and sprint capacity in the upper half of the rotation speed range. The revised secondary ratio also gave it a good deal more pulling power than before. In order to do justice to this increased torque, the 6-speed gearbox was revised with enlarged bearing diameters.

2007/2009: The evolution from CIH to DOHC engine with overhead camshafts.

The next major step in the development of the R 1200 engine followed in 2009. It was fitted with a DOHC boxer engine which, in terms of design principle and basic structure, was very similar to the one that had powered the 98 kW (133 hp) HP2 Sport back in 2007. The new boxer engine now had two overhead camshafts per cylinder, having undergone selected revision and optimisation for its debut in the R 1200 GS. While the previous engine had provided supreme forward thrust in all conditions, the new R 1200 GS took a significant step further in this regard. With an output of 81 kW (110 hp) at 7 750 rpm, a maximum torque now increased by 500 to 8 500 rpm and thus an even broader engine speed range, the boxer exhibited even greater dynamic performance, sprint capacity and pulling power across the full engine speed range.

2012: The boxer switches to water cooling and has a shared housing for the engine and gearbox.

Three years later in 2012, BMW Motorrad presented for the first time in the R 1200 GS a successor engine that had finally been redesigned in all points, now with water as the coolant rather than oil – right on time to mark the 90th anniversary of the BMW Motorrad boxer engine with which it all began.

A change in the cooling system ensured the required level of performance as well as adhering to anticipated requirements of the future in terms of noise and exhaust emissions. The 92 kW (125 hp) boxer engine still featured air/liquid cooling, but here engine oil was replaced as a coolant by a glycol/water mixture. This ensured a high level of heat absorption capacity for more efficient heat dissipation. This so-called precision cooling involved only those engine elements that are particularly exposed to thermal stress. All in all, however, the engine still mainly used air cooling in addition, thereby preserving the characteristic appearance of the boxer engine. Two radiators were small and inconspicuously integrated in the vehicle as a whole for this purpose.

This was the first volume-production BMW Motorrad boxer engine in which the DOHC cylinder heads featured vertical rather than horizontal flow, however. Other world firsts in the history of the BMW Motorrad boxer engine at this point also included the integrated gearbox with wet clutch and anti-hopping function, together with a universal shaft now positioned on the left-hand side. With an output of 92 kW (125 hp) at 7 700 rpm and 125 Nm at 6 500 rpm, the new engine offered supreme engine and performance figures. Finally in 2018, the consistent, logical further development of this successful engine makes its debut in the all-new BMW R 1250 GS.

6. Accessories program BMW R 1250 GS.



Options are supplied directly ex works and are integrated during the production process. Original BMW Accessories are installed by the BMW Motorrad dealer or by customers themselves. These are also features which can be retrofitted.

Original BMW Motorrad Accessories.

HP Parts.

- HP sports silencer.
- HP covers for expansion tank (ML: Q1/2019).
- HP rider footrests, adjustable (ML: Q1/2019).
- HP engine housing cap, front (ML: Q1/2019).
- HP foot lever, adjustable (ML: Q1/2019).
- HP hand lever, adjustable (ML: Q1/2019).
- HP oil filler plug (ML: Q1/2019).
- HP abrasion pads for cylinder head covers (ML: Q1/2019).
- HP mirror ML: Q1/2019).
- HP cylinder head covers (ML: Q1/2019).

Storage program.

- Vario case.
- Holder for Vario luggage system and topcase, large.
- Liner for Vario case.
- Aluminium case.
- Aluminium case, black.
- Holder for aluminium luggage system and Atacama luggage system.
- Holder for aluminium luggage system and Atacama luggage system, black.
- Liners for aluminium case.
- Carry handle for aluminium case/topcase.
- Vario topcase.
- Liner for Vario topcase.
- Back pad for Vario topcase.
- Aluminium topcase.
- Aluminium topcase, black.
- Liner for aluminium topcase.
- Back pad for aluminium topcase.

- Topcase, large, 49 l.
- Liner for topcase, large.
- Back pad for topcase, large.
- Luggage roll Atacama, 40 l.
- Side bags Atacama.
- Tank rucksack, large, 11-15 l (ML: Q1/2019).
- Tank rucksack, small, 8 l (ML: Q1/2019).
- Vario insert for tank rucksack.
- Softbag Sport, small.
- Softbag Sport, large.
- Bag for luggage bridge.
- Bag for passenger seat, 14-18 l (ML: Q1/2019).
- Luggage panel, passenger seat.
- Luggage roll, 50 l.

Design.

- LED turn indicator (not for USA/Canada).
- Rear silencer, chrome-plated.
- Footrest holder rear, black.
- Rear axle cover.
- Radiator trim elements "Style", black.
- Front wheel cover extension.
- Option 719 covers for expansion tank, Classic (ML: Q1/2019).
- Option 719 rider footrests, adjustable, Classic (ML: Q1/2019).
- Option 719 engine housing cap, front, Classic (ML: Q1/2019).
- Option 719 foot lever, adjustable, Classic (ML: Q1/2019).
- Option 719 hand lever, adjustable, Classic (ML: Q1/2019).
- Option 719 oil filler plug, Classic (ML: Q1/2019).
- Option 719 mirror, Classic (ML: Q1/2019).
- Option 719 cylinder head covers, Classic (ML: Q1/2019).

Ergonomics and comfort.

- Retrofit set – Riding Modes Pro.
- Retrofit heated grips.
- Shift Assistant Pro.
- Gear lever, adjustable.
- Gear lever, adjustable, black.
- Footbrake lever, adjustable.
- Enduro footrests, height-adjustable.
- Rider footrest, adjustable, black.
- Windshield Rallye.
- Windshield Rallye, tinted.
- Windshield, tinted.

- Rallye seat, high with luggage panel (seat height 890 mm).
- Rallye seat, low with luggage panel (seat height 860 mm, standard in R 1200 GS Rallye).
- Comfort seat, high (seat height 860/ 880 mm).
- Comfort seat, low (seat height 830/ 850 mm).
- Rider seat Exclusive, low (seat height: 820/840 mm).
- Rider seat Exclusive (seat height: 850/870 mm).
- Rider seat, Exclusive, high (seat height: 870/890 mm).
- Rider seat, high (seat height: 870/890 mm).
- Rider seat, low (seat height: 820/840 mm).
- Passenger seat Exclusive.
- Passenger seat Exclusive, narrow.
- Passenger seat Comfort.

Navigation and communication.

- BMW adapter cable for Apple iPhone/iPod.
- BMW adapter cable for micro-USB.
- BMW Motorrad dual USB charger with cable, 60 cm.
- BMW Motorrad dual USB charger with cable, 120 cm.
- Retrofit set – preparation for navigation unit.
- BMW Motorrad Navigator VI.
- Car kit for BMW Motorrad Navigator VI.

Safety.

- Brake disc lock with alarm system.
- Headlamp guard (ML: Q1/2019).
- LED additional headlight.
- Protective foil for 6.5-inch TFT screen.
- First aid set, large.
- First aid set, small.
- Safety screw for oil filler neck.
- Safety screw for oil filler neck, black.
- Frame guard.
- Hand protector.
- Hand protector "Style", Light White.
- Radiator guard.
- Enduro aluminium engine protection bar.
- Crash bar.
- Cylinder head cover protector.
- Retrofit set – RDC.
- Retrofit set – alarm system.

Maintenance and technology.

- Indoor motorcycle cover, large.
- Indoor motorcycle cover.
- Motorcycle cover.
- Mini foot pump.
- Tyre pressure travel set.
- Multifunction tool.
- LED torch.
- BMW Motorrad battery charger.
- On-board toolkit – service set.
- On-board toolkit – adapter for flush-fitting pencil coil.
- Sport lift stand, front.
- Lift stand, rear.
- Additional power socket.
- Motorcycle carpet.
- Motorcycle care set.
- Engine gloss spray, 300 ml.
- Rim cleaner, 500 ml.
- Gloss polish, 250 ml.
- Insect remover, 500 ml.
- Metal polish, 75 ml.
- Body + Bike shower gel, 250 ml.
- Seat care (for smooth imitation leather), 50 ml.
- Motorcycle cleaner, 500 ml.
- Original BMW Engine Oil ADVANTEC Ultimate 5W-40, 1 l.
- Original BMW Engine Oil ADVANTEC Ultimate 5W-40, 500 ml.

9. Technical specifications.



R 1250 GS		
Engine		
Capacity	cc	1,254
Bore/stroke	mm	102.5 x 76
Output	kW/bhp	100/136
at engine speed	rpm	7,750
Torque	Nm	143
at engine speed	rpm	6,250
Type	Air/liquid-cooled 2-cylinder 4-stroke boxer engine with two overhead, spur gear driven camshafts , a counterbalance shaft and variable intake camshaft control system BMW ShiftCam	
Compression		12.5/1
Fuel		Premium unleaded 95 RON
Valves per cylinder		4
Ø intake/outlet	mm	40/34
Ø throttle valve	mm	52
Engine control		BMS-O
Emission control	Closed-loop three-way catalytic converter, exhaust standard EU-4	
Electrical system		
Generator	W	508
Battery	V/Ah	12/11.8
Headlamp		LED
Rear light		LED brake light/rear light
Starter	W	900
Power transmission		
Clutch	Wet clutch with anti-hopping function, hydraulically activated	
Transmission	Constant mesh 6-speed gearbox with helical gearing system	
Primary ratio		1.650
Gear transmission ratios	I	2.438
	II	1.714
	III.	1.296
	IV.	1.059
	V	0.943
	VI.	0.848
Secondary drive		Cardan
Secondary ratio		2,910

R 1250 GS

Suspension

Frame construction type		Two-section frame concept consisting of main frame with bolt-on rear frame, load-bearing engine
Front wheel control		BMW Motorrad Telelever, central spring strut, Ø 37 mm
Rear wheel control		Cast aluminium single-sided swing arm with BMW Motorrad Paralever, WAD spring strut, continuously adjustable spring preload by means of hand wheel, rebound-stage damping adjustable by hand wheel (Option: Dynamic ESA)
Spring travel, front/rear	mm	190/200
Wheel castor	mm	100,6
Wheelbase	mm	1,514
Steering head angle	°	64.3
Brakes	front	Twin disc brake, floating brake discs, Ø 305 mm, 4-piston radial brake calipers
	rear	Single disc brake, Ø 276 mm, 2-piston floating caliper
ABS		BMW Motorrad Integral ABS as standard (part integral), disengageable (option: ABS Pro)
Wheels		Die-cast aluminium wheels
	front	3.00 x 19"
	rear	4.50 x 17"
Tyres	front	120/70 R19
	rear	170/60 R17

Dimensions and weights

Total length	mm	2,207
Total width including mirrors	mm	952.5
Seat height	mm	850/870 (800 to 900 possible)

DIN unladen weight, road ready	kg	249
Permitted total weight	kg	465
Fuel tank capacity	l	20

Performance figures

Fuel consumption (WMTC)	l/100 km	4.75
CO2	g/km	110
Acceleration 0-100 km/h	s	3.6
Top speed	km/h	200