The new BMW S 1000 R.

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1. Overall concept. Short version.

"With our new S 1000 R, we have tried to preserve the strengths of its predecessor and to take into account the potentials known to us from press and customer feedback in the new S 1000 R. The team also made perfect use of the benefits provided by the new architecture"
Ralf Mölleken, Project Manager Complete Vehicle

The new BMW S 1000 R – the Dynamic Roadster based on the S 1000 RR enters a new dimension.
Emotional roadster look combined with supersports riding dynamics - that's what the new BMW S 1000 R is all about. Derived directly from the supersports S 1000 RR in the key areas engine and chassis, the dynamic roadster offers the same innovative technology. The close kinship to the "RR" can be seen from every angle. With its reduction to the essentials, the new S 1000 R offers unprecedented dynamic response. Thanks to its acceleration-optimised 121 kW (165 hp) peak output combined with the unrivalled low weight of 199 kg (DIN) as well as ABS Pro, Dynamic Traction Control (DTC), full-scale LED lighting and much more as standard, the new S 1000 R once once again sets the benchmark in the dynamic roadster segment.

Newly developed, 5 kg lighter drive based on the S 1000 RR with adapted gear ratios, optimised mid-range power and engine drag torque control (MSR) as optional extras.
The in-line four-cylinder is based on the engine of the S 1000 RR and generates 121 kW (165 hp) at 11 000 rpm. The maximum torque of 114 Nm is available at 9 250 rpm. The engine speed range was made even wider, fuller and more harmonious in terms of achieving even more improved rideability thanks to a particularly linear torque curve. In order to reduce the noise and fuel consumption levels as well as the engine speed level, especially at cruising speeds on country roads, the 4th, 5th and 6th gears now have longer gear ratios. In addition to a smoother, self-reinforcing anti-hopping clutch, the new S 1000 R is equipped with engine drag torque control (MSR) for the first time as an optional extra. The engine drag torque control prevents the rear wheel from slipping as a result of abrupt throttling or downshifting thanks to being electronically controlled.

Completely new, lighter chassis based on the S 1000 RR with Flex Frame, Full Floater Pro kinematics, underslung swingarm and optimised ergonomics.
The chassis was also subjected to significant weight reduction, just like the entire motorcycle. The frame and swingarm are based on the S 1000 RR and have been made considerably lighter in than their predecessor. At the same time, the engine in the so-called Flex Frame takes on a much greater supporting function than before. The new frame offers further benefits due to its very narrow design. This considerably reduces the motorcycle's width in the area of the knee contact area, thereby offering a more relaxed riding position with even more freedom of movement. An adjustable handlebar clamp enables the rider to make ergonomic adaptations. Two positions are already available as standard: 0 mm / +10 mm towards the front. In addition, 10 mm handlebar riser mounts are offered as an option, which can also be turned in the direction of travel by 0 mm / +10 mm.

The underslung swingarm has been taken over from the S 1000 RR and the spring strut with Full Floater Pro kinematics is now located significantly further away from the swing axis and the engine. This prevents the engine from heating up due to waste heat and ensures even more stable temperature behaviour and even more constant damping response. In combination with the

swingarm, which has its roots in motorsports, this results in more tyre grip and lower tyre wear.

Three riding modes, Dynamic Traction Control (DTC) and ABS Pro as standard. Optional equipment "Riding Modes Pro" with riding mode "Dynamic Pro", Dynamic Brake Control (DBC), engine drag torque control (MSR, "Engine Brake" and "Power Wheelie".
The new S 1000 R is equipped as standard with Dynamic Traction Control DTC, ABS Pro with banking angle optimisation and the three riding modes "Rain", "Road" and "Dynamic". The fully configurable "Dynamic Pro" mode is also available with a particularly wide range of setting options as part of the "Riding Modes Pro" option. With "Riding Modes Pro", the new S 1000 R also features the "Engine Brake" function in conjunction with the engine drag torque control (MSR) and the "Power Wheelie" function. As part of the "Riding Modes Pro" option, Dynamic Brake Control (DBC) additionally supports the rider during emergency braking manoeuvres.

Multifunctional instrument cluster with 6.5-inch TFT screen for excellent readability and maximum range of information.
The new S 1000 R's instrument cluster was also taken over from the S 1000 RR. Special emphasis was placed on the best possible readability in addition to an extended range of functions and information. The screen was therefore designed to be large for good readability and optimum information display even under difficult lighting conditions. The rider can choose between customised screen displays for various purposes. The Pure Ride Screen, for example, provides all the necessary information for normal road riding, while a further Core Screen shows displays for banking angle, deceleration and traction control. A bluetooth smartphone interface which allows app-based arrow navigation is already included as standard. The TFT display is operated comfortably from the handlebars using the multi-controller. The optional M package provides a third Core Screen with bar display and lap timer.

New LED headlamp and powerful LED light units as standard. Headlight Pro with adaptive turning light and iconic light guides with daytime running light function as an optional extra ex works.
The lighting units of the new S 1000 R are based on state-of-the-art LED technology. These include the new, striking LED main

headlamp with optimised low beam and high beam light. The newly designed turn indicator and rear lights also make use of LED technology. The rear turn indicators have been adopted from the S 1000 RR and feature an integrated tail/brake light function. The front turn indicators are "hidden" in the fork area. Enhanced safety when riding at night is ensured by the adaptive turning light which is a component of Headlight Pro as an ex works option. In this case, further LED modules are added. The rider benefits from improved road illumination when cornering to make riding at night even safer.

New, even more dynamic design in an attractive basic colour and two exclusive style variants.
In its latest edition, the S 1000 R also clearly borrows from its supersports counterpart, the S 1000 RR, but placing the emphasis on its character as a dynamic roadster. To a greater extent than previously, the "tail up - nose down" look gives the S 1000 R an eye-catchingly dynamic visual impact with its new body elements. The colour concept also highlights the sporty, dynamic appearance of the new S 1000 R. In addition to the basic colour Racingred non-metallic, the options Style Sport and the M package with additional product content are available.

The highlights of the new BMW S 1000 R:

• 5 kg lighter, newly developed 4-cylinder in-line engine based on the S 1000 RR with further optimised mid-range power and rideability as well as new gear ratios in 4th - 6th gear.

• Lightest dynamic roadster in its class: Weight reduction by 6.5 kg to 199 kg DIN empty weight or 202 kg including comfort and dynamics package. The M package reduces the vehicle weight by another 4.8 kg (2 kg with forged wheels / 3.7 kg with carbon fibre wheels).

• Superior output and torque: 121 kW (165 hp) at 11 000 rpm and 114 Nm at 9 250 rpm.

• At least 90 Nm of torque available from 5 500 to 12 000 rpm. More than 80 Nm already available from 3 000 rpm.

• Effort-saving, linear torque curve: Even better rideability across the entire engine speed range.

• Newly developed suspension featuring the “Flex Frame”, with the engine taking on more of a load-bearing function.

• Significantly improved ergonomics thanks to the “Flex Frame” allowing the rider to have his knees closer to the motorycyle body.

• Underslung swingarm with Full Floater Pro kinematics and new suspension strut for even more sensitive response and optimised rear wheel grip.

• New, lighter exhaust system, EU5 compliant.

• New 6-axis sensor box for precisely determining the pitch rate and anti-wheelie function.

• ABS Pro for even more safety when braking, also in banking position, as standard. Dedicated rain brake mode with flatter brake pressure gradient. ABS Pro as standard for even safer braking when cornering.

• WSBK proven DynamicTraction Control (DTC) as standard ensures even greater stability when accelerating.

• Three riding modes "Rain", "Road" and "Dynamic" as standard.

• DTC wheelie function as standard.

• Riding Modes Pro with additional "Dynamic Pro" mode including adjustable wheelie control, engine brake and engine drag torque control (MSR) as well as Launch Control, Pitlane Limiter and Hillstart Control Pro as ex works options.

• Hillstart Control as standard.

• Shift Assistant Pro for quick up and down shifting without using the clutch available ex works.

• New instrument cluster with 6.5 inch, easy-to-read TFT display including additional sports screens, arrow navigation and connectivity.

• New LED headlamp and LED light units as standard.

• Adaptive Turning Light and daytime running light in Headlight Pro package available as an option ex works.

• Completely newly designed body elements for even more dynamic styling.

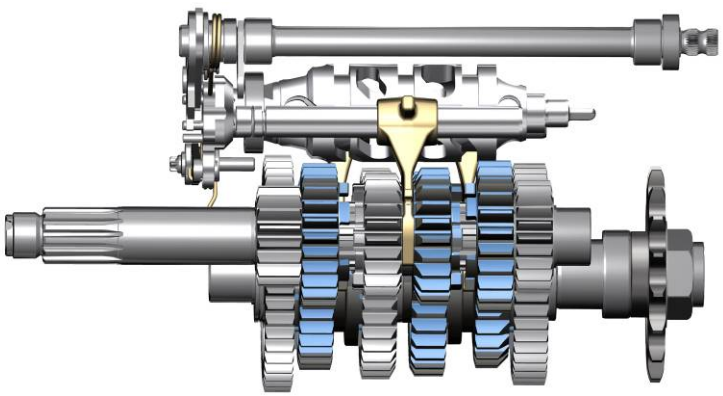
• Attractive basic colour and two style variants available from start of production.

• Expansion of the Original BMW Motorrad Accessories and optional extra range, including M package, Carbon package and Milled Parts package ex works.

2. Drive.

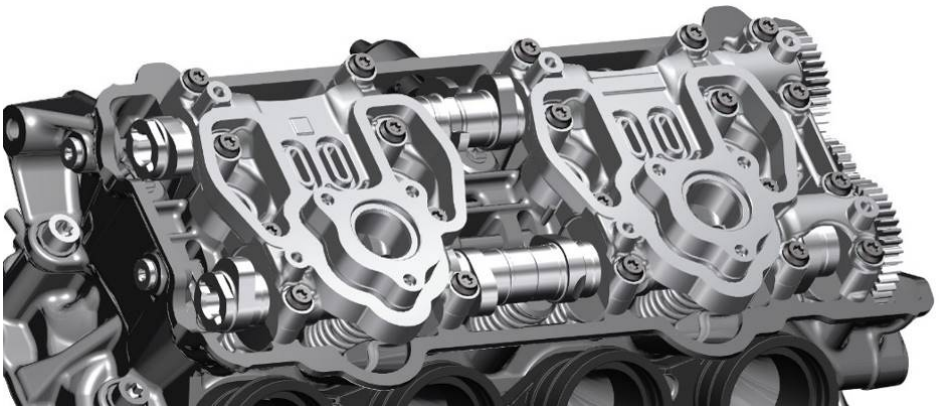
"The engine of the new S 1000 R is derived directly from the supersports S 1000 RR. The development challenge was to maintain the power and free-revving character in the relevant engine speed range even without the use of BMW ShiftCam. In some ranges we were even able to surpass the S 1000 RR!"
Jörg Vogt, Head of S 1000 Series Drive Projects

Completely new 4-cylinder engine based on the RR engine with adapted gear ratios for reduced fuel consumption and noise levels.
The new S 1000 R features a completely newly developed water-cooled 4-cylinder in-line engine based on the S 1000 RR power unit. Its peak output is 121 kW (165 hp) at 11 000 rpm. The maximum torque is 114 Nm and is reached at 9 250 rpm. Compared to the predecessor model, compression was increased from 12.0 to 12.5. In the S 1000 R the useable engine speed range was made even wider, fuller and more harmonious in terms of achieving even more improved rideability thanks to a particularly linear torque curve. Compared to the predecessor model, the 4th, 5th and 6th gears now have longer gear ratios (gears 1 - 3 remain identical). This lowers the engine speed level by up to 8%, but without affecting the dynamic performance the rider experiences. In addition, fuel consumption according to WMTC has been reduced from 6.7 to 6.2 litres compared to the predecessor (8% reduction).



Even better everyday rideability and high performance during very sporty riding thanks to optimised mid-range power.
In practice, the particularly linear torque curve and the engine's great pulling power are the most important factors. Acceleration from 0 to 200 km/h now only takes 8.0 s making it 5% faster than its predecessor. The new S 1000 R manages the balancing act between fast sporty runs on country roads and trackday fun even better than before. The new engine of the S 1000 R now provides even more thrust in the lower and medium speed range than its predecessor, which wasn't known for a lack of power in this range, and allows for ballistic performance while ensuring the rider always maintains absolute control.

Much lighter and more compact basic engine with well-established 4-valve technology, hollow-bored titanium intake valves and speed-resistant rocker arms.
For each combustion chamber there are four valves made of steel. The shafts of the intake valves are also hollow-bored, which minimises the accelerated masses on the valve train. As before, the valves are activated via light, speed-resistant and DLC-coated rocker arms – though these are now designed to be 25 % lighter than those in the predecessor model (weight reduced from 8 g to 11 g).



As before, the cylinder barrels are integrated in the upper half of the engine housing and they are smoothly polish-honed in order to achieve reduced friction. In the same way as in the predecessor model, the upper half of the housing also holds the light and compact 6-speed transmission, which now features further enhanced shift precision. Compared to the previous model, the operating force required was reduced by 20 N to 65 N thanks to the self-reinforcing anti-hopping clutch.

By comparison with the very light basic engine of the predecessor model, the power unit in the new S 1000 R has been designed to be much lighter still as well as more compact. In addition to the newly designed engine housing, this is due to additional weight reductions in other engine components. For example, the camshafts are now powered directly from the crankshaft – the previous idler gear is no longer necessary. The intermediate gear for halving the engine speed is now located directly inside the cylinder head. What is more, the oil and water pump are combined to form a compact module. This gives the new engine an even tidier look. In the new design, it was also possible to reduce the tubing for the water and oil cooling circuit to a minimum, as well as achieving a high level of impact resilience. In order to reduce overall width by more than 12 mm as compared to the predecessor model, there is now only one gearwheel on the crankshaft, since the intermediate gear of the starter motor engages directly with the clutch gear or primary gear. The starter motor has been integrated on the top of the housing behind the cylinders. The crankshaft position is now detected via the alternator. In order to reduce the overall height of the engine, the length of the heat-treated steel rods was also reduced by 4 mm to 99 mm. At the same time the rods weigh 10 % less than in the predecessor model.

As a result of these comprehensive measures, the new engine weighs a total of 5 kg less than the engine of the predecessor model.

As before, oil is supplied in the form of wet sump lubrication, though the oil sump base has been lowered significantly in the interests of much enhanced operational safety.

Newly calculated cam profiles and optimised intake system for optimum torque curve and delivery.

With the aim of achieving the best possible torque delivery and a torque curve that is as linear as possible, the new S 1000 R features cam profiles that have been adapted and optimised to suit its area of application. The intake system has been optimised with the aim of further improving rideability, especially in the lower and medium speed range which is important for riding on country roads. The new S 1000 R likewise has a so-called full-e electromotive throttle actuator, or “electronic throttle grip”. The

effect when riding is a pleasant reduction in the force required to operate the throttle grip, as well as perfect controllability of the engine.

As before, carburetion is achieved by fully sequential, cylinder-selective fuel injection with two injectors per cylinder. The airbox as well as the air supply have been newly designed. As a result, in conjunction with the newly designed intake ports, filling and gas exchange are now even more effective.

A completely new and lighter exhaust system with front silencer and short, compact rear silencer ensure pleasant sound and noise characteristics.
The overriding goal of further enhancing the new S 1000 R in terms of output and torque while at the same time further reducing vehicle weight was likewise pursued by the BMW Motorrad developers in creating the new exhaust system.

It was partially taken over from the S 1000 RR, is made of stainless steel like before and features two three-way catalytic converters. In addition to improved performance data and optimised sound as well as reduced noise levels during comfort-oriented riding at constant speeds, the new exhaust system also enables a weight saving of around 1.2 kg or 10% compared to the predecessor model.

Riding modes “Rain”, “Road”, “Dynamic” and “Race” as well as the latest generation of Dynamic Traction Control DTC and DTC wheelie function as standard. "Riding Modes Pro" with riding mode "Dynamic Pro" and further functions are optionally available.
The new S 1000 R already uses the latest generation of Dynamic Traction Control DTC as standard. The new 6-axle sensor box now also records the pitch rate, from which the DTC banking angle-dependent traction control system, which has proven itself in the World Superbike series, benefits significantly. With 100 control intervals per second it works even more sensitively to achieve outstanding performance.

The new S 1000 R also features the three riding modes "Rain", "Road" and "Dynamic” as standard. The fully configurable "Dynamic Pro” mode is also available with a particularly wide range of setting

options as part of the "Riding Modes Pro" option. With "Riding Modes Pro", the new S 1000 R also features the "Engine Brake" function in conjunction with the engine drag torque control (MSR).

Wheelie behaviour can also be changed in the "Dynamic Pro" riding mode. In the standard modes, the front wheel lift-off detection suppresses or limits wheelies with the aim of achieving maximum acceleration. The "Power Wheelie" setting also allows the front wheel to actively lift off.

Two adjustable throttle curves for optimum response.
The new S 1000 R already features two throttle curves as standard, which are firmly linked to the respective riding modes "Rain", "Road", "Dynamic" and, in the special "Riding Modes Pro" option, also to the "Dynamic Pro" riding mode:

• Rain: Gentle throttle response, drive torque reduced in gears 1 to 3.

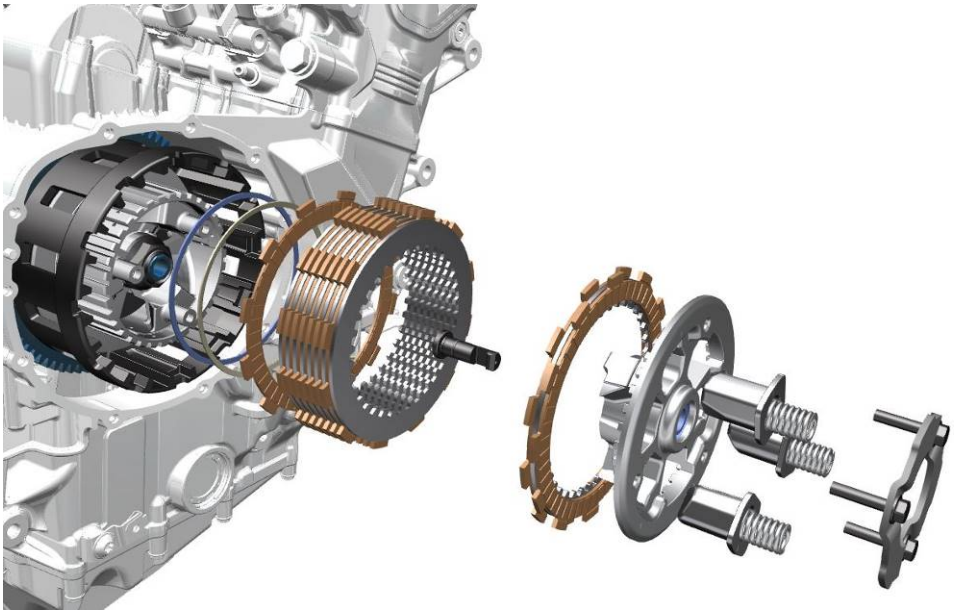
• Road: Optimum throttle response, drive torque reduced in gears 1 and 2.

• Dynamic: Optimum throttle response, drive torque reduced in gears 1 and 2.

• Dynamic Pro: Optimum throttle response, maximum torque in all gears. In addition, maximum drive torque in all gears can be combined with soft throttle response here.

Self-reinforcing anti-hopping clutch with reduced manual force as well as engine drag torque control (MSR) and "Engine Brake" function available as options ex works.
In addition to a standard self-reinforcing anti-hopping clutch with 25 % less manual force and a 5-fold adjustable hand lever, engine drag torque control (MSR) is available ex works as an option for the new S 1000 R for the first time. The engine drag control prevents the rear wheel from slipping as a result of abrupt throttling or downshifting thanks to being electronically controlled. An anti-hopping clutch is opened from a mechanically preset threshold in order to prevent the rear wheel from stamping – for example when shifting down. However, if the tyre's available grip capacity is below this opening threshold, for example in wet conditions, the rear wheel could still exceed the static friction limit due to the engine drag torque and simultaneous activation of the rear wheel brake and then slip.

Thanks to MSR, the new S1000 R detects this danger at an early stage. Depending on the riding mode, the throttle valves are opened in the millisecond range until the drag torque is reduced appropriately to keep the rear wheel in the static friction range. For the rider this ensures even more safety, especially on slippery road surfaces.



The “Engine Brake” function for adjusting engine braking torque in conjunction with engine drag torque control (MSR) has three settings:

• Rain: Engine brake torque and MSR maximum.

• Road: Engine brake torque and MSR maximum.

• Dynamic: Engine brake torque and MSR medium.

• Dynamic Pro: Engine brake torque and MSR medium. In addition, the engine braking torque and the MSR can be adjusted in minimal steps here.

Hill Start Control as standard and Hill Start Control Pro for comfortable starting and stopping on slopes as an option ex works.

The new S 1000 R features Hill Start Control to facilitate starting on gradients as standard. The Hill Start Control Pro option goes one better than the Hill Start Control system by providing the additional

Auto HSC function. 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. The additional function can be deactivated and activated manually or automatically via the settings menu.

Shift Assistant Pro for fast up and down gear shifting without using the clutch, available as optional equipment ex works.
Shift Assistant Pro allows upshifting without activating the clutch, thereby enabling perfect acceleration virtually without torque interrupt. It also allows downshifting without clutch or throttle valve activation within the relevant load and engine speed ranges. This means that very fast shifts are possible, while clutch activation is reduced to a minimum.

3. Suspension.

"The new S 1000 R benefits from the lightweight design concept of the RR. This and other modifications to the chassis are reflected in excellent handling characteristics without having to sacrifice comfort"
Sebastian Epp, Project Manager Chassis

The new development of the S 1000 R is not only reflected in the completely drive technology design. In fact the new S 1000 R's outstanding riding dynamics and riding fun derive to a significant extent from the completely newly engineered suspension. Here, it is the optimum interplay between the frame design and the engine as a load-bearing element that has a key role to play.

New, much lighter "Flex Frame" with the engine more closely integrated in the frame as a load-bearing element.
The centrepiece of the suspension in the new S 1000 R is still an aluminium bridge frame, though the layout of this has been drastically altered as compared to the predecessor model. The main frame is still configured as a welded structure made of four chill cast elements with the engine integrated at a 32-degree forward tilt as before, but now with a much more extended function as a load-bearing element.

With the aim of achieving a substantial weight reduction, the two top frame tubes, the steering head section and the engine mounts

are now designed in such a way that the load-bearing function of the engine is further expanded.

It is due to the fact that a greater proportion of the engine is integrated in the suspension structure that the weight of the frame has been reduced by some 11.5% (1.31 kg). What is more, the requirement in designing the new main frame was to have the force applied directly to the engine structure via the shortest possible paths. The entire composite structure of the main frame, rear frame and swinging arm was also newly calculated to achieve an optimum combination of stiffness and flexibility. Hence the name Flex Frame.

All in all, the extensive weight reduction measures taken in the new S 1000 R result in a total weight saving of 5.1 kg compared to its predecessor and an unrivalled low DIN empty weight of 199 kg .

Optimised ergonomics for more freedom of movement and comfort thanks to a narrower frame.

The new frame offers further benefits due to its very narrow design. In the area relevant for achieving good knee grip, it reduces the width of the motorcycle considerably by 13 mm to 30 mm. The rider benefits by being able to keep his legs together more closely allowing for a more relaxed riding posture as well as more freedom of movement when riding on race tracks and country roads. In addition, the ergonomic triangle has been shifted forward by about 15 mm compared to the predecessor, giving the rider a noticeably more front-wheel-oriented position.

New suspension geometry for further improved handling, ride precision, traction and feedback.

In developing the suspension of the new S 1000 R, the primary goals were to further increase agility, feedback and ride precision and to enhance the mechanical grip of the rear wheel. The geometry is strongly based on the S 1000 R. The steering head angle has been changed from 65.2° to 66° with a correspondingly adjusted offset of the fork bridges, thereby making the angle steeper. The castor is thus slightly reduced to 96.3 mm (previously 98.5 mm). However, the wheelbase increases from 1 439 to 1 450 mm due to the longer swingarm. The steering angle has been increased by 5° compared to the predecessor to 33° on the right and left to facilitate manoeuvring.

The new suspension geometry also results in clearer, improved feedback both at the front and from the rear wheel control. The new S 1000 R also offers optimised handling qualities as well as being more precise and directionally accurate to ride.

New wheel guides with Full Floater Pro kinematics, new underslung swinging arm and upside-down front telescopic fork. In order to hone the qualities of the suspension even more, wheel suspension was refined as well. The underslung swinging arm was taken over from the S 1000 RR. It is a single-section chill cast part. The spring strut, which has a 20 % more stroke, is now located much further away from the swinging pivot axis.

The aim of this overall redesign was to position the central spring strut as far away as possible from the engine, thereby suppressing undesired heating as a result of engine heat discharge. This results in an even more stable temperature response, thereby ensuring more consistent damping forces. In combination with a swinging arm derived from motor racing and the latter's optimised force transmission, this provides significant benefits for the rear tyre: the positive effects here are increased grip and reduced impact on the tyre itself.

The spring strut transmission ratio has been altered from 1.9 to 1.6:1, with the diameter of the main piston on the shock absorber enlarged to 46 mm. These two measures create a larger hydraulic volume flow and much lower operating pressures. In addition, the spring strut is friction-optimised (anodised) and has a wet-running piston rod guide with a separator piston mounted by means of Teflon tape. All this has a positive effect on comfort and performance, because response is improved and force build-up in the spring strut is fast and precise.

The reduction of the transmission ratio achieved with the Full Floater Pro kinematics results in a fast, precise force build-up in the damper element and allows significantly more usable suspension travel at the rear wheel. As before, the central spring strut is fitted with an adjustable spring rest, damping rebound and compression stage. The spring strut thus permits perfect tuning opportunities to meet the most varied requirements. The total spring travel at the rear axle is 117 mm.

The new S 1000 R also meets the high dynamic riding demands with regard to front wheel suspension in the form of an upside-down fork. The upside-down fork with a slide tube diameter of 45 mm (previously 46 mm) offers a high degree of brake stability, as well as a stable response and transparent feedback.

The upside-down fork is fitted with so-called closed-cartridge inserts, i.e. separate hydraulic piston-cylinder systems, and is fitted with adjustment options for the spring rest as well as the damping rebound and compression stage. Here again, a sensitive response, a broad adjustment range and very high damping reserves ensure maximum riding dynamics and individual set-up options – for race track use as well. The total spring travel is 120 mm.

Dynamic Damping Control DDC – the new generation of the electronic damper control system is available as an option ex works.

The new S 1000 R can also be fitted with the electronically regulated suspension system Dynamic Damping Control DDC – though now in a completely new generation. The spring strut and fork have been fitted with new, motorcycle-specific damper valves, which allow the rider to really feel the difference between the comfort and sports settings.

The damping of the new-generation DDC is generated via conventional shim-fitted pistons. Maximum damping can be reduced as needed, however. The DDC valve is located in the piston bypass and is capable of optimum damping force build-up in real time (adjustment time ~10 ms) – without any loss in terms of feedback.

The DDC damper piston is fitted with a conventional mechanical shim package. The oil stream flows parallel to this through the conventionally shimmed piston (Ø 46 mm) and an electrically adjustable bypass. If the current-fed valve is closed, the oil flows through the conventional piston only. This has the benefit of generating maximum damping. The electronically controlled valve runs according to the relevant characteristic curve, depending on mode and speed. Current feed is adapted within 10 ms to generate the relevant damping. Damping for country road use is essentially geared towards comfort and stability. The DDC Shim Package is equivalent to the classic mechanically structured and

fitted valve. This has the advantage that suspension specialists can adapt the suspension to the rider's needs.

The DDC damping valves in the predecessor model were connected in series. The volume flow passed through the conventional and electrically adjustable damping section. Conventional damping was the lowest level of damping available. The electrical DDC valve increased damping. However, this resulted in the familiar drawback that the compromise between comfort and high damping tended to cause underdamping and pumping of the suspension.

To summarise: The mechanical valve of the new DDC can be applied to maximum damping. The advantage for race track use is perfect damping. The soft "damping curve" can be used when riding on country roads. The necessary adjustments take effect within approx. 10 ms.

The basic settings of the DDC are linked to the riding modes "Rain", "Road", "Dynamic" and in case of the "Riding Modes Pro" option also to "Dynamic Pro". In "Rain" and "Road" mode, the DDC set-up focus is on full, pleasant damping which can be described as sporty and comfortable. The area of application for the "Road" DDC damping characteristic is preferably country roads with an asphalt surface ranging from poor to good. Alternatively, the rider can select the "Dynamic" damping setting.

The "Dynamic" and "Dynamic Pro" riding modes, on the other hand, focus on very good country roads or the race track. The DDC damping characteristic "Dynamic" is available in this case. Alternatively, the rider can select the "Road" damping setting.

DDC is also able to take into account the load state of the new S 1000 R. Accordingly, the rider can set the DDC setting in the configuration menu for rides in solo mode (1 helmet) or in pairs (2 helmets).

Light cast wheels and ABS Pro in optimised set-up for maximum performance and safety when braking.
When it comes to weight reduction, the new S 1000 R benefits from 17-inch light-alloy wheels, as used on the S 1000 RR. Compared to its predecessor, the new set of wheels weighs

around 1.8 kg or the equivalent of 17 % less. The reduced rotational masses lead to optimised handling in particular. In

addition to the aluminium cast wheels, the range of optional equipment also offers even lighter M forged wheels (-963 g, 9%) and M carbon wheels (-2 783 g, 27%). To match these wheels, sports tyres with a rear width of 200 mm (instead of 190 mm) and thicker brake discs (5 mm instead of 4.5 mm) have been fitted. For all wheel types, tyre pressure control (RDC) is also available ex works as an optional extra.

The new S 1000 R is equipped with a superior braking system. At the front there are two radially mounted 4-piston fixed calipers in conjunction with 320 mm steel brake discs which are 4.5 mm thick just like on the S 1000 RR. In total the front brake discs weigh some 0.5 kg less, thereby also contributing significantly to weight reduction. The front master brake cylinder is new and now has an integrated and no longer externally mounted reservoir. At the rear, deceleration is taken care of by a single-piston floating caliper with a 220 mm steel brake disc.

The ABS Pro now fitted as standard on the new S 1000 R offers the greatest possible safety not only when braking in a straight line, but also when braking in corners. Even when braking fast in banking position, ABS Pro is able to prevent the wheels from blocking, thereby reducing the risk of falling when banking – even in the event of panic braking. In the riding modes "Rain", "Road" and "Dynamic", the ABS Pro characteristics are pre-set. In the "Dynamic Pro" mode, however, the function can be adjusted in five settings. As a further innovation, the S 1000 R has its own rain brake mode. While the "Rain" and "Road" modes were previously identical, the brake pressure gradient in the "Rain" mode is now somewhat flatter, and the maximum deceleration is 0.1 m/s^2 less.

As part of the "Riding Modes Pro" option, Dynamic Brake Control (DBC) additionally supports the rider during emergency braking manoeuvres on the new S 1000 R. DBC increases safety when braking, even in difficult situations, by avoiding unintentional

accelerator activation. As soon as the sensor cluster supplies a certain deceleration value during braking, any simultaneous desire to accelerate on the part of the rider is detected as implausible and throttle valve opening is suppressed. This keeps the motorcycle stable and shortens the braking distance. In addition, the dynamic brake light (DBL) is activated. The brake light flickers and the hazard warning lights are activated to warn following traffic.

4. Electrical system and electronics.

“The 6.5 inch TFT screen offers a level of quality in terms of display and information that is unrivalled in this segment. Readability and operation is unprecedented, and the range of accessible information leaves nothing to be desired.”
Anton Dötterböck, Project Engineer Electrical System

New LED headlamp and powerful LED light units as standard. Headlight Pro with adaptive turning light and iconic light guides with daytime running light function as an optional extra ex works.
The lighting units of the new S 1000 R are based on state-of-the-art LED technology. These include the new, striking LED main headlamp with optimised low beam and high beam light. The newly designed turn indicator and rear lights also make use of LED technology. The rear turn indicators have been adopted from the S 1000 RR and feature an integrated tail/brake light function. The front turn indicators are "hidden" in the fork area.

Enhanced safety when riding at night is ensured by the adaptive turning light which is a component of Headlight Pro as an ex works option. In this case, further LED modules are added. The rider benefits from even better illumination of the road on bends, thereby ensuring even safer riding at night.

The adaptive turning light, which is unique in the mid-range, works by switching on additional LED elements in the main headlight that are fitted with their own reflectors, depending on the banking angle. It is activated from an inclined position of more than 7° and a speed of more than 10 km/h. The additional lighting effect can be perfectly experienced up to a banking angle of 25°.

As a further component of the Headlight Pro optional equipment, an additional sickle-shaped LED light guide takes over the function

of the LED daytime running light and, together with a backlit "R", simultaneously provides the characteristic likeness and high recognition value of a BMW Motorrad dynamic roadster.

New instrument cluster in the form of a large, perfectly readable 6.5 inch TFT screen with an unrivalled range of information and readability.
The new S 1000 R adopts the 6.5 inch TFT display as is used on the S 1000 RR. The rider can choose the display to suit his needs in the instrument cluster of the new S 1000 R which offers various screen displays. The new instrument cluster was further developed based on the existing platform of the S 1000 RR and adapted to meet the needs of the S 1000 R.

As with the version for the supersports bike, the variety of information, quality of display and, last but not least, the user-friendliness of the new instrument cluster are currently unrivalled. The new S 1000 R is equipped as standard with the BMW Motorrad Connectivity App, practical arrow navigation with route import and multiple waypoint guidance on the display. The Navigator VI unit from the Original BMW Motorrad Accessories range is available for demanding route guidance.

In addition to an expanded range of functions and information, the BMW Motorrad developers attached particular importance to excellent readability of the 6.5 inch TFT screen. For optimum visibility even in difficult light conditions, the screen was therefore designed to be large for good readability. It is linked to the Multi Controller (MMC) on the left-hand handlebar panel and can be operated quickly, safely and conveniently from there.

The new TFT screen offers individually tailored displays for differing purposes. The Pure Ride Screen, for example, provides all the necessary information for normal operation on the road, while two further Core Screens show the displays for banking angle, deceleration and traction control (Core Screen 1) and current and best lap times (Core Screen 2). The dynamic red speed range provides further useful information. Here the red area of the rev counter begins at below 6 000 rpm when the engine is cold and increases as the engine warms up to the setpoint of 11 000 rpm. The rev counter is displayed in the Core Screen in the form of a bar chart, in the Sport Screen as a round instrument. A further possible

screen display provides the motorcycle's status overview with the most important messages including tyre pressure control RDC. The optional M package provides a third Core Screen with bar display and lap timer.

Alongside the digital display of speed, rpms, selected mode, settings for ABS Pro, DTC and Dynamic ESA/Dynamic ESA Pro and the menus, it is also possible to access the following wide range of information on the screen (depending on the options fitted), for example:

• Current banking position, left/right.

• Maximum banking position achieved, left/right.

• Current deceleration in m/s^2.

• Maximum deceleration achieved in m/s^2.

• Engine speed reduction by DTC.

• Speed limit Info: If the motorcycle is connected to the app, the speed limits currently stored in the navigation system are displayed.

• Trip 1 and 2.

• Average speed and fuel consumption 1 and 2.

• Break and travel times 1 and 2.

• Front/rear tyre pressure.

• Remaining range.

• Total kilometres.

• Fuel tank fill level.

5. Design and colour concept.

"The second generation of the S 1000 R is significantly more masculine and sharply defined. Sharp edges and accentuated beads clearly emphasise the precision of the machine."
Vianney Selosse, Designer S 1000 R.

For the first time on a motorcycle, BMW is offering a 2k windscreen Sport on the S 1000 R, which is black at the bottom and transparent in the upper area.
Hannes Sievers-Paulsen, Project Manager. Body

Even more dynamic design meets variable sporty ergonomics.

In its latest edition, the S 1000 R also clearly borrows from its supersports counterpart, the S 1000 RR, but placing the emphasis on its character as a dynamic roadster. To a greater extent than previously, the "tail up - nose down" look gives the S 1000 R an eye-catchingly dynamic visual impact with its new body elements. The low front end and high rear also visually convey what the technical DNA of the S 1000 R is all about: low weight, sporty lightness and a high level of dynamic riding performance.

The much more reduced, angular design of the S 1000 R compared to the super sports S 1000 RR was brought out even more in the new edition of the S 1000 R. A distinctively designed rear section with enlarged side openings allows the rear frame to be shown to even greater advantage, thus emphasising the sporty, dynamic character of the new S 1000 R. The locking mechanism for the passenger seat cover in the form of an ejector flap has also been redesigned.

The new LED main headlamp makes it possible to design an even more compact lamp mask, resulting in an even shorter front, making the new S 1000 R look even more and muscular. The bodywork elements such as the fuel tank side panels, the tank centre cover, the side panels in the shape of a stylised "R" and the engine spoiler have also been redesigned. They also convey the core features of the new S 1000 R even more strongly than before: Pure power for highly dynamic riding fun on country roads and very fast laps on the race track.

The new design is accompanied by ergonomic refinements - something that BMW Motorrad development always focuses on. For example, a reversible handlebar clamp now allows the handlebar reach to be increased by 10 mm, which is particularly suitable for tall people and ensures an even better riding position. In addition, 10 mm handlebar riser mounts are offered as an option, which can also be turned in the direction of travel by 0 mm / +10 mm. The new S 1000 R offers further ergonomic adjustment options for the seat height. For example, the standard seat height of 830 mm can be changed to 850 mm or 810 mm, depending on individual requirements, with the optional "high" or "low" seats.

Attractive base colour, Style Sport and M paint finish.

The colour concept also highlights the sporty, dynamic appearance of the new S 1000 R. In addition to the basic colour Racingred non-metallic, the M Motorsport paint finishes are available with the Style Sport and the M package options.

The new S 1000 R really stands out with the Racingred non-metallic finish. The Style Sport option with the basic colour Hockenheim Silver metallic, in combination with matt copper metallic components such as the rear frame section and engine side covers as well as grey anodised components, emphasises the technical highlights of the dynamic roadster.

In the M Motorsport paint finish reserved for the M package with the base colour Lightwhite non-metallic in combination with light blue, dark blue and red, the new S 1000 R combines maximum sportiness with exclusive looks. In this paint finish, the dynamic roadster looks particularly light and agile. This means the new S 1000 R is the first model in BMW Motorrad's portfolio to inherit the iconic colours of the M 1000 RR.

6. Equipment program.

Optional equipment and Original BMW Motorrad Accessories.
An extensive program of optional equipment and Original BMW Accessories is available for customising the new BMW S 1000 R. Optional equipment items are supplied ex works and are integrated in the production process. Original BMW Accessories are installed by the BMW Motorrad dealer or by customers themselves. These items can also be retrofitted.

Options.

- **Comfort package:** Keyless Ride Light (ignition only), USB charging port heated grips, cruise control.
- **Dynamics package:** Riding Modes Pro (Riding Mode Dynamic Pro, MSR, DBC, HSC Pro, Launch Control, Pitlane Limiter), Shift Assistant Pro, DDC, engine spoiler.
- **M Package:** M forged wheels or M Carbon wheels (extra charge), M lightweight battery, titanium sports silencer, M endurance chain, M Motorsport paint finish, M laptrigger unlock code, M sport seat, M fuel cap.
- **Carbon package:** M Carbon front mudguard, M Carbon rear mudguard, M Carbon chain guard, M Carbon wind deflector.
- **Milled parts package** M hand levers left/right, M hand lever protectors left/right, M footrest system, M replacement footrests pillion passenger.

Individual options.

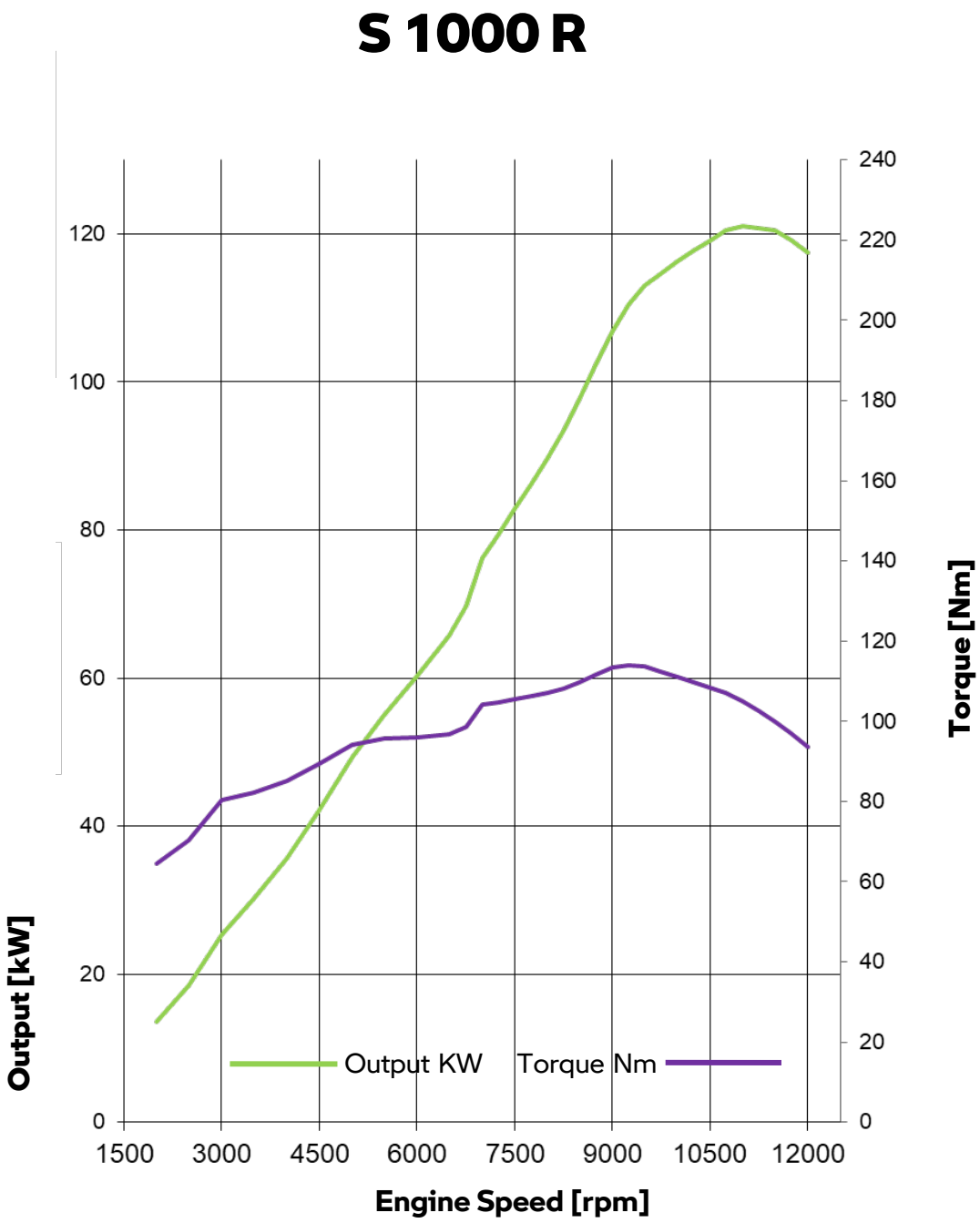
- Headlight Pro with daytime running light icon and adaptive turning light (market-dependent).
- Passenger package (standard delivery with monoposto cover).
- Tyre pressure control RDC (market-dependent).
- Intelligent emergency E-Call (market-dependent).

• Design option wheels.
• Rider's seat, low 810 mm.
• Rider’s seat high 850 mm.
• M rider’s seat 830 mm.
• Windshield Sport 2k.
• Alarm system DWA (market-dependent).
• M Passenger seat (with brake ramp).
• Passenger seat. (normal).
• M forged wheels.
• M Carbon wheels.
• M lightweight battery.
• **Titanium sports silencer**
• M endurance chain.
• Activation code M laptrigger.

• **Original BMW Motorrad Accessories.**

• Handlebar extension (+10 mm)
• Navigation system holder
• Sports brake
• Side bags
• Rear bag
• Tank bag
etc.

7. Engine output and torque.



8. Technical specifications.

			BMW S 1000 R
Engine			
Capacity		cc	999
Bore/stroke		mm	80/49.7
Output		kW/hp	121/165
At engine speed		rpm	11000
Torque		Nm	114
At engine speed		rpm	9250
Type			Water-cooled in-line 4-cylinder engine
Compression/fuel			12.5:1 / premium (super plus) unleaded petrol, octane number 95-98 (RON) (knock control; rated output with 98 RON)
Valve/accelerator actuation			DOHC (double overhead camshaft) Valve activation via individual rocker arms
Valves per cylinder			4
Ø intake/outlet		mm	33.5/27.2
Throttle valve diameter		mm	48
Engine control			BMS-O
Emission control			Closed-loop three-way catalytic converter
Electrical system			
Alternator		W	330
Battery series/ AGM		V/Ah	12 / 9, maintenance-free
Battery M Lightweight / Li Io		V/Ah	12 / 5, maintenance-free
Headlight		~~W~~	Full LED headlamp
Starter		kW	0.8
Power transmission – gearbox			
Clutch			Self-reinforcing multi-plate anti-hopping wet clutch, mechanically activated
Gearbox			Constant-mesh 6-speed gearbox
Primary ratio			1.652
Transmission ratios	I		2.647
	II		2.091
	III.		1.727
	IV		1.476
	V		1.304
	VI		1.167
Rear wheel drive			Chain 525
Secondary ratio			2.647
Suspension			
Frame construction type			Aluminium composite bridge frame, load-bearing engine
Front wheel control			Upside-down telescopic fork, sliding tube diameter ø 45 mm
Rear wheel suspension			Aluminium underslung double-sided swingarm with central spring strut and Full Floater Pro kinematics
Spring travel, front/rear		mm	120/117
Wheel castor		mm	96.3

			BMW S 1000 R
Wheelbase		mm	1450
Steering head angle		°	66.0
Brakes		Front	Twin disc brake, floating, Ø 320 mm, radial 4-piston fixed calipers
		Rear	Single-disc brake, Ø 220 mm, single-piston floating caliper
ABS			BMW Motorrad ABS Pro (part integral)
Traction control			BMW Motorrad DTC
Wheels			Standard: Die-cast aluminium wheels Aluminium M forged wheels or M carbon wheels as special equipment
		Front	3.50 x 17"
		Rear	6.00 x 17"
Tyres		Front	120/70 ZR17
		Rear	190/55 ZR17
		ZR17	With M wheels 200/55
Dimensions and weights			
Total length		mm	2090
Total width with mirrors		mm	812
Seat height		mm	830
DIN unladen weight, road ready, fully fuelled		kg	199
Permitted total weight		kg	407
Fuel tank capacity		l	16.5
Performance figures			
Fuel consumption (WMTC)		l/100 km	6.2
CO2		g/km	144
Acceleration km/h	0-100	s	3.2
Top speed		km/h	>250