The new BMW S 1000 XR.
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1. Overall concept. (Short version)

“It’s always difficult for a successor model to improve on a multiple test winner like the S1000 XR. We’ve gone to a great deal of trouble to make changes – both large and small – to ensure the XR is a little better in every way.” Ralf Mölleken, Project Manager Complete Vehicle

The new BMW S 1000 XR – even lighter, even faster and even more versatile.
The new BMW S 1000 RR sees its world premiere at the EICMA 2019. The new edition of the best-selling Adventure Sport bike is radically lighter and more agile, as well as achieving an unprecedented combination of long-distance performance and sports capabilities. With a completely newly developed engine and suspension and a DIN unladen weight of 226 kg – 10 kg less than its predecessor when adjusted for equipment – the S 1000 XR opens up a whole new dimension in the Adventure Sport segment. The new S 1000 XR advances the sports to touring range in its own distinctive new way, leaving nothing to be desired – not least because it has the following standard features on board: Dynamic ESA, riding modes Pro, ABS Pro & DTC, Hill Start Control Pro, a perfectly readable 6.5” TFT screen complete with connectivity and full LED lighting.

Newly developed engine weighing 5 kg less and based on the S 1000 RR, with adapted gear ratios, further increased mid-range power and engine drag torque control (MSR).
The newly developed in-line 4-cylinder engine is based on the S 1000 RR engine and delivers an output of 121 kW (165 hp) at 11,000 rpm. The maximum torque of 114 Nm is available at 9,250 rpm. Based on a particularly linear torque curve, it was possible to further make the engine speed range somewhat broader, more fulsome and more harmonious with a view to

enhanced ridability. The 4th, 5th and 6th gear now have longer ratios in order to reduce noise, fuel consumption and engine speed level, especially at country road speeds. In addition to a smoother and self-reinforcing anti-hopping clutch, the new S 1000 XR also features engine drag torque control (MSR) for the first time. Electronically controlled, the MSR prevents the rear wheel from slipping as a result of abrupt throttling or downshifting.

Completely new, lighter suspension with directly articulated suspension strut and Dynamic ESA/Dynamic ESA Pro.
Just like the motorcycle as a whole, the suspension has been slimmed down considerably. The frame and swinging arm are now 2.1 kg lighter; at the same time, the engine has a much more pronounced load-bearing function than before. The new double-sided swinging arm reduces unsprung masses by 1.6 kg, offering a particularly sensitive response thanks to direct linkage.

The new S 1000 XR already features the latest generation of BMW Motorrad Dynamic ESA (Electronic Suspension Adjustment) as standard. Thanks to the latest valve technology, the versatile Adventure sports bike provides a particularly dynamic riding experience with a high level of ride comfort. Dynamic ESA Pro is available as an optional extra with two damping modes (Road, Dynamic) and automatic load compensation. For the first time in the S 1000 XR, the dynamic brake assistant DBC (Dynamic Brake Control) also supports the rider during braking manoeuvres.

Four riding modes along with the latest generation of Dynamic Traction Control DTC and DTC Wheelie function. ABS Pro with DBC (Dynamic Brake Control) for even greater safety when braking in banking position.
The new S 1000 XR has four standard riding modes – “Rain”, “Road”, “Dynamic” and “Dynamic Pro”. The "Dynamic Pro" mode, which can be fully configured for the first time in the S 1000 XR, offers a wide range of setting options. In addition to throttle response, engine brake, ABS control and traction control, wheelie control (including the new "Power Wheelie" setting) can be configured separately for the first time in the new S 1000 XR. While the part integral BMW Motorrad ABS systems already provide a very high degree of performance and safety when braking in a straight line, ABS Pro now takes this a step further to offer increased safety when braking in banking position as well.

Multifunctional instrument panel with 6.5-inch TFT screen for excellent readability and maximum range of information.
The instrument cluster in the new S 1000 XR has also been completely redeveloped. In addition to an extended range of functions and information,

particular importance was attached to achieving the best possible readability. For optimum visibility even in difficult light conditions, the screen was therefore designed to be large. It offers tailor-made screen displays for a range of different purposes. The Pure Ride screen has all the information required for regular riding on the road, for instance, while an additional Core screen enables banking positing, braking and traction control to be displayed. Another possible screen display provides a vehicle status overview. A practical arrow navigation system with app is included as standard. The TFT display is operated conveniently from the handlebars using the MMC (Motorcycle Multi Controller).

New LED light units and adaptive turning light with DRL in Headlight Pro as an ex-works option.
All lighting units in the ECE version of the new S 1000 XR draw on the latest LED technology (the US version has no front LED turn indicators). In addition to the turn indicators and the rear light unit, this includes the high-intensity main headlamp with two symmetrically arranged LED units each for low beam, high beam and parking light. The new LED headlamp now illuminates the road even more effectively than before. In the ex-works option Headlight Pro, the adaptive turning light ensures additional safety when riding at night. Here, the rider benefits from enhanced illumination of the road when cornering. The optional equipment item Headlight Pro also includes DRL (Daytime Riding Light) for better recognition of the vehicle during the day. LED additional headlamps are also available as ex-works options for improved visibility at night and enhanced recognition in road traffic.

Even more refined and more dynamic design with optimised ergonomics and two attractive colour schemes.
The new layout of the main frame, fuel tank flanks and body parts in the seat area provides better support and an improved knee grip. What is more, optimised contact surfaces and a newly defined ergonomic triangle between the handlebar ends, seat surface and footrests make for optimum ergonomics.

The new S 1000 XR underlines its strong character with dynamic proportions, while its design style continues to deploy unique sculptured surfaces. Solutions from the touring and GS sectors combine with sporty elements to give the bike a powerful presence in terms of its overall appearance, reflecting its wide range of possible uses.

The new S 1000 XR also reflects its unmistakable character in two different colour schemes: the refined basic finish in Ice Grey and the highly dynamic finish in Racing Red/White Aluminium, available at extra cost.

The highlights of the new BMW S 1000 XR:

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

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

• Effort-saving, linear torque curve: even better ridability over the entire speed range.

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

• Significantly improved ergonomics due to Flex Frame.

• Dynamic ESA as standard plus Dynamic ESA Pro with two damping modes (Road, Dynamic) and automatic load compensation as ex-works options.

• New 19% lighter swinging arm with directly articulated suspension strut for an even more sensitive response.

• Dynamic brake assistant DBC Dynamic Brake Control.

• Weight reduction by 10 kg to 226 kg (adjusted for equipment) as compared to the predecessor model.

• New, lighter exhaust system, EU5-compliant.

• New 6-axis sensor cluster.

• Dynamic Traction Control DTC as standard.

• DTC Wheelie Function as standard.

• Engine drag torque control MSR and engine brake function as standard.

• ABS Pro for increased safety when braking, also in banking position, as standard. Dedicated rain braking mode with flat brake pressure gradient.

• Four riding modes “Rain”, “Road”, “Dynamic” and “Dynamic Pro” as standard.

• Hill Start Control Pro as standard.

• HP Shift Assistant Pro for quick up and down shifting without clutch as an ex-works option.

• Electronic cruise control as an ex works option.

• New instrument cluster with 6.5-inch, easy-to-read TFT screen and four screen displays.

• LED light units all round.

• Turn indicators with new “Comfort Indicator” function.

• Adaptive turning light incl. DRL as part of Headlight Pro as an ex-works option.

• Completely redesigned bodywork for an even more dynamic design style, optimised aerodynamics and even further enhanced wind and weather protection.

• Two colour schemes for the market launch: Ice Grey and Racing Red/White Aluminium (extra charge).

• Extension of the range of Original BMW Motorrad Accessories and ex-works options.

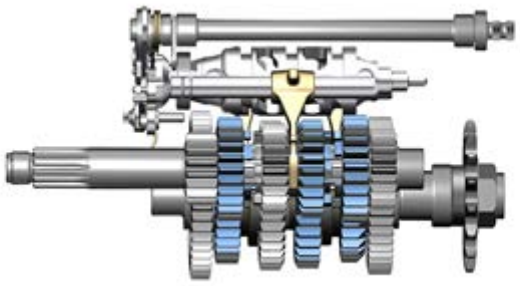
• Case holder (decoupled) in series production.

2. Drive.

“The engine of the new S 1000 XR is directly derived from the supersports model S 1000 RR. The challenge with the S 1000 XR was to create a power unit derived from the RR's supersports engine that was going to be much more suitable for touring than its predecessor, though without compromising its dynamic characteristics and performance”.
Thomas Ziemendorf, Project Manager Motorcycle Drive

Completely new 4-cylinder engine based on the RR engine with adapted gear ratios for reduced consumption and noise levels.
The new S 1000 XR is powered by a newly developed water-cooled 4-cylinder in-line engine based on the S 1000 RR engine. The peak output is 121 kW (165 hp) at 11 000 rpm. The maximum torque of 114 Nm is reached at 9 250 rpm. As compared to the predecessor model it was possible to increase compression from 12.0 to 12.5. With a particularly linear torque curve in the new XR, however, it was possible to further make the engine speed range somewhat broader, more fulsome and more harmonious with a view to enhanced ridability. Compared to the predecessor model, the 4th, 5th and 6th gears now have a longer ratio. This lowers the engine speed level by up to 8% without impairing dynamics as experienced by the rider. In addition, fuel

consumption according to WMTC has also been reduced by 8% from 6.7 to 6.2 litres as compared to the predecessor model.



Further improved day-to-day ridability and high performance when riding in very sporty style thanks to further optimised mid-range power.
In practice, the particularly linear torque curve and the high level of torque have a positive effect. As such, the new S 1000 XR manages the balancing act between leisurely touring and sporty-style country road riding – and it is fully able to do fast laps on the race track, too. The new engine of the S 1000 XR offers that bit more power at low and mid-range engine speeds as compared to a predecessor that was itself far from feeble, as well as allowing an even more supreme riding style over all types of terrain.

Much lighter and more compact basic engine with well-established 4-valve technology, hollow-bored steel intake valves and speed-resistant rocker arms.
For each combustion chamber there are four valves made of steel. In addition, the shafts of the intake valves are hollow drilled, thereby reducing weight. 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. Operational force has been reduced by 20 N to 65 N as compared to the predecessor model thanks to the self-reinforcing anti-hopping clutch.

In comparison with the very light basic engine of the predecessor model, the power unit in the new S 1000 XR 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 the overall width by more than 12 mm as compared to the predecessor engine, there is now only one gearwheel on the crankshaft, as the starter's primary reduction gear meshes directly with the clutch or primary gearwheel. 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 further enhanced suction reliability.

Recalculated cam profiles and optimised intake system for optimum torque.

With the aim of achieving the best possible torque and the most linear torque curve possible, the new S 1000 XR has recalculated cam profiles to suit its range of applications. The intake system has also been optimised in order to further improve ridability, particularly in the lower and medium speed ranges that are so important on country roads. Of course, the new S 1000 XR also features the tried-and-tested BMW Full Ride-by Wire System, i.e. an "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, the fuel mixture is prepared by means of a fully sequential, cylinder-selective fuel injection system with two injection nozzles per cylinder. The intake silencer has been reconfigured, as has the air intake. As a result – and in conjunction with the newly designed intake ports – filling and gas exchange are now more effective.

Engine drag torque control MSR.
In addition to an anti-hopping clutch, the new S 1000 XR also features engine drag torque control (MSR) for the first time. Electronically controlled, the MSR prevents the rear wheel from slipping as a result of abrupt throttling or downshifting. 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 adhesive 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 slip.

Thanks to the standard MSR, the new S 1000 XR detects this risk at an early stage. Depending on the riding mode selected, the throttle valves are opened within milliseconds to such an extent that the drag torque is suitably reduced to keep the rear wheel within the static friction range. This results in even further enhanced safety for the rider, especially on slippery roads.

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

The latter was also completely newly designed: made of stainless steel like the predecessor model, it features two three-way catalytic converters In addition to improved riding performance data and a more pleasant sound, as well as reduced noise levels for comfort-oriented travel and constant riding, the new exhaust system also enabled weight savings of around 1.2 kg or 10 % as compared to the predecessor model.

Riding modes “Rain”, “Road”, “Dynamic” and “Dynamic Pro”, along with the latest generation of Dynamic Traction Control DTC and DTC **wheelie function** with 6-axis sensor cluster.
The new S 1000 XR features the four riding modes “Rain”, “Road”, “Dynamic” and “Dynamic Pro”. The "Dynamic Pro" mode can be fully configured for the first time in the S 1000 XR and offers a particularly extensive range of adjustment options; as an innovation, the S 1000 XR now features the “Engine Brake” functions in conjunction with engine drag torque control MSR. In addition, the new S 1000 XR is fitted with the latest generation of Dynamic Traction Control (DTC). The new 6-axis sensor cluster now also detects the pitch rate, thereby significantly benefiting cornering-dependent traction control DTC – something which has proved so effective in World Superbike racing. With 100 control intervals per second, it now works even more sensitively and precisely for maximum performance.

Furthermore, wheelie response can be altered in “Dynamic Pro” mode. While in the standard modes the front wheel lift-off detection suppresses or limits wheelies with the aim of maximum acceleration, the “Power Wheelie” setting also allows the front wheel to be actively lifted off.

Two adjustable throttle curves for optimum response. “Engine Brake” with MSR engine drag torque control.
The new S 1000 XR already has two throttle curves as standard, which are permanently linked to the respective riding modes “Rain”, “Road”, “Dynamic” and “Dynamic Pro”:

• Rain: gentle throttle response, drive torque reduced in gears 1 – 3.

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

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

• Dynamic Pro: optimum throttle response, maximum torque in all gears. In addition, the maximum drive torque in all gears can be combined with a gentle throttle response.

The “Engine Brake” function in conjunction with the engine drag torque control MSR has three settings:

• Rain: engine braking torque and MSR maximum.

• Road: engine braking torque and MSR maximum.

• Dynamic: engine braking torque and MSR medium.

• Dynamic Pro: engine braking torque and MSR medium. Here it is also possible to set the engine braking torque and MSR to minimum.

Hill Start Control Pro as standard for convenient set-off on gradients.
Even in its standard trim the new XR offers the function Hill Start Control to facilitate starting on slopes. The additional function can be deactivated and activated either manually or else automatically via the settings menu. When “Auto HSC” is set, the holding brake is automatically activated on a gradient (greater than +/- 5 %) after the motorcycle has come to a standstill. If “Manual” is selected, the hand or foot brake lever is briefly actuated.

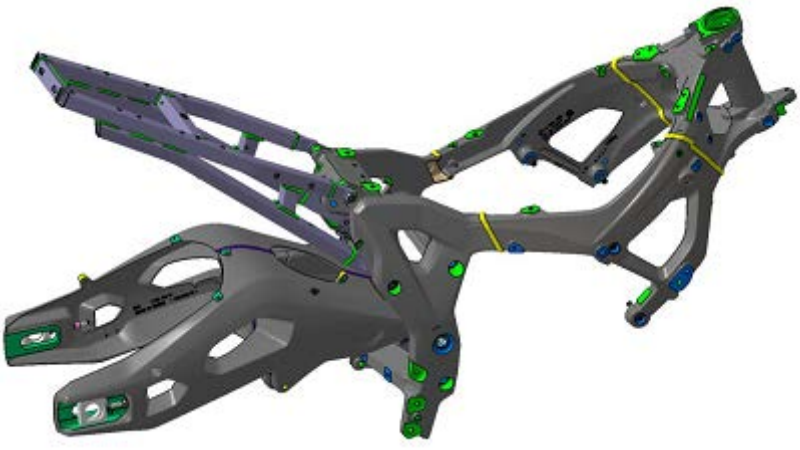
Shift Assistant Pro for shifting up and down without using the clutch.

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 main aim in terms of the new XR suspension was to develop further enhanced riding dynamics as well as achieving a significantly reduced weight as compared to the predecessor model. We were able to meet this target by means **of the new main frame: the engine is now much more closely integrated as a load-bearing element, and there are a whole range of optimised details.**” Marcus Mund, Project Manager Motorcycle Suspension.

The new development work undertaken in the S 1000 XR is not only reflected in its completely newly developed drive technology. In fact the new model’s enhanced riding dynamics and riding fun as compared to the predecessor model derive to a significant extent from the completely newly engineered suspension. Here, the key factor is the optimum interplay between the frame design and the engine as a load-bearing element.



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 XR 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 pronounced 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 is reduced by some 2 %. 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 rear frame of the new S 1000 XR is also new and even lighter, weighing in at around 9% less. 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.

The extensive measures taken to reduce the weight of the new S 1000 XR are reflected in a DIN unladen weight of 226 kg.

Optimised ergonomics and comfort due to a narrower frame, a more front-wheel-oriented seating position and vibration-decoupled handlebars with reduced width.

The new frame offers further benefits due to its very narrow design. In the area relevant to achieving good knee grip, it reduces the width of the motorcycle significantly. The rider now benefits from a much reduced spread of the upper thighs, which makes for a more relaxed riding posture. As compared to the predecessor model, the rider has also been moved 20 mm further forward, enabling an even more active and at the same time more relaxed riding posture. Further advantages are even better feedback from the front wheel and not least an optimised weight distribution.

From an ergonomic point of view, the new S new 1000 XR benefits from handlebars that are 30 mm narrower. Without having to do without the superior, typical Adventure-style riding posture, the reduced handlebar width offers definite benefits – especially in the case of manoeuvring by riders who are less tall. The vibration decoupling of the handlebars has been completely redesigned. The new handlebar clamps have pressed-in rubber bushings which offer much more effective decoupling without compromising steering precision or accuracy.

New suspension geometry for further improved handling, ride precision, traction and feedback.
In developing the suspension of the new XR, the primary goals were to further increase agility, feedback and ride precision and to enhance the mechanical grip of the rear wheel. As such, the steering head angle was altered from 64.5° to 65.1°, with the offset of the fork bridges adjusted as necessary. The castor was reduced to 116 mm (previously 117 mm). At the same time, the wheelbase was extended to 1,552 mm.

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

New, lighter rear wheel control with directly articulated strut and double-sided swinging arm.
The rear wheel control was likewise altered with the aim of further honing the bike's suspension qualities. The swinging arm was also completely redesigned and is manufactured as a chill cast part from two welded halves. At 6.6 kg, it also weighs 20% less than before. The suspension strut is now articulated directly by the swinging arm. This results in a reduction of unsprung masses as well as reduced friction and thus improved progression, also making for more sensitive responsiveness and increased comfort. The total spring travel at the rear axle is 150 mm (previously 140 mm). The new S 1000 XR also meets high demands in terms of riding dynamics with an upside-down fork for front wheel control. The total suspension travel here is also a comfortable 150 mm.

Dynamic ESA (Electronic Suspension Adjustment) for optimum riding dynamics in all situations as standard. Dynamic ESA Pro as an ex-works option.
The latest generation of the electronic suspension BMW Motorrad Dynamic ESA (Electronic Suspension Adjustment) means the new S 1000 XR is able to offer a particularly dynamic riding experience and a high level of ride comfort.

Unlike conventional suspension systems – i.e. those that are not electronically controlled, Dynamic ESA Pro taps into a whole new dimension of ride safety, performance and comfort since the damping is automatically adapted

automatically based on riding state and manoeuvre. Here, a damping mode (Road) is available, with manual load setting (rider/rider + luggage/rider + passenger).

Meanwhile, the configurable ex-works option Dynamic ESA Pro offers two damping modes (Road, Dynamic) and load compensation is automatic. In addition, Dynamic ESA Pro offers a so-called “min” setting for minimum spring pre-load. This is accompanied by the lowest possible riding position, which can offer benefits when raising the motorcycle from the side support in pillion mode, for example.

Both Dynamic ESA and Dynamic ESA Pro work with completely redesigned damper valves. Even in the preconfigured basic form of the Dynamic ESA, they allow the spring elements to respond much more sensitively, and as compared to their predecessors they offer a noticeable increase in comfort. The new valve technology is based on a conventional shim package as in racing. This makes for a low compression stage (important for comfort) and a tight rebound stage (important to prevent body vibrations). At the same time, the electronic damping valve is additionally activated in real time (cycle time: 10 ms) as a bypass in order to achieve optimum damping at the given moment depending on the current riding manoeuvre, deceleration, acceleration, banking position, etc.. At the same time, noticeable improvements have also been achieved in the area of friction reduction in order to increase sensitivity. Larger piston diameters, more oil volume, lower system pressures, better sliding coatings and the above-mentioned new swinging arm with direct linkage ensure that springing is smoother than ever before.

With Dynamic ESA Pro, the damping control range is extended to the maximum and “Dynamic” mode provides tight damping for a particularly high level of riding dynamics. Dynamic ESA Pro is not only available as an optional extra: it can also be retrofitted by a BMW Motorrad dealer later as an accessory.

Light-weight cast wheels, ABS Pro in optimised set-up and DBC Dynamic Brake Control for maximum performance and safety when braking.

In terms of weight reduction, the new S 1000 XR benefits from the 17-inch light-alloy wheels used for the S 1000 RR. As compared to its predecessor, the new wheel set weighs around 1.8 kg or 17 % less. The reduced rotational masses are reflected in optimised handling qualities. In addition to the aluminium cast wheels, the range of optional equipment also includes even

lighter M forged wheels. Tyre pressure control RDC is also available as an optional extra for both wheel types.

The new S 1000 XR is equipped with a braking system that works with supreme ease. 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. In total the front brake discs weigh some 0.5 kg less, thereby also contributing significantly to weight reduction. At the rear, deceleration is taken care of by a 2-piston floating caliper with a 265 mm steel brake disc.

The now standard ABS Pro offers maximum safety in the new S 1000 XR – not just when braking straight ahead but also when braking on bends. Even when braking fast in banking position, ABS Pro is able to prevent the wheels from locking, thereby reducing the risk of falling when banking – even in the event of panic braking. The ABS Pro characteristics are fixed in the riding modes “Rain”, “Road” and “Dynamic”. In "Dynamic Pro" mode, on the other hand, the function can be set to five different levels. As a new feature in the S 1000 XR, rear wheel control can be deactivated in “Dynamic Pro” mode, e.g. for brake drifts. Another novel aspect of the S 1000 XR is that it has a dedicated rain braking mode. While the “Rain” and “Road” modes were previously identical, the brake pressure gradient in the “Rain” mode is now somewhat flatter, with maximum deceleration 0.1 m/s^2 lower.

For the first time in the S 1000 XR, DBC Dynamic Brake Control also supports the rider during braking manoeuvres. 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.

4. Electrical system and electronics.

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

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 XR is fitted with the 6.5-inch TFT screen used in the S 1000 RR. The instrument cluster in the new S 1000 XR offers various screen displays, and the rider can select the one they wish to use according to needs. The new instrument cluster has been further developed based on the existing platform of the S 1000 RR and adapted to the uses of the S 1000 XR.

As is the case with the version for the supersports model, the variety of information, display quality and not least the user-friendliness of the new instrument cluster are currently unmatched. The new S 1000 XR, in conjunction with the BMW Motorrad Connectivity App, already comes as standard with practical arrow navigation and multiple waypoint guidance in the display.

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 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. For example, the Pure Ride screen has all the information required for regular riding on the road, for instance, while an additional Core screen enables

banking position, braking and traction control to be displayed. The dynamic red engine speed range provides further useful information. The red range of the engine speed display starts at less than 6 000 rpm when the engine is cold and increases to the target level of 11 000 rpm as the engine warms up. The engine speed display appears in the Core screen in the form of a bar chart, while in the Sport screen it is shown as a circular instrument. If required, an additional possible screen display provides a status overview of the vehicle, incorporating the most important information such as that of tyre pressure control RDC.

Alongside the digital display of speed, revolutions per minute, selected riding mode, settings for ABS Pro, DTC and DDC 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 warning (“SPEED” appears when a previously defined speed is exceeded).
- Average speed.
- Average fuel consumption.
- Trip 1 and 2.
- Remaining range.
- Total kilometres.
- Fuel tank fill level.

New, even more high-performance LED light units all round. Turn indicators with new “Comfort Indicator” function. LED auxiliary headlamps and Headlight Pro with adaptive turning light, plus daytime riding light icon as an ex-works option.

All lighting units in the ECE version of the new S 1000 XR draw on the latest LED technology (the US version has no front LED turn indicators). These include the high-intensity main headlamp with two symmetrically arranged LED units each for low beam, high beam and parking light. The indicator lights at the front and the tail light unit including indicator lights adopted from the supersports bike S 1000 RR also make use of LED technology, as does the instrument cluster with its indicator lights. The number plate carrier, turn indicators and number plate lights are all designed to form a single unit. What is more, the brake light and tail light have now been integrated in the turn indicators, too. The C-shaped rear light signature means the XR is instantly recognisable as a BMW even in its night-time appearance.

The new LED headlamp not only gives the S 1000 XR a highly dynamic look, it also lights up the road even more effectively than before. The integrated parking lights enhance the bike's unmistakable appearance. The optional Headlight Pro (ECE version only) includes a special Daytime Riding Light DRL. The “Comfort Indicator” function is a new feature. Here, the turn indicator is automatically reset depending on speed.

Even greater safety at night is offered by the adaptive turning light Headlight Pro, available as an ex-works option. The two headlamp segments are each supplemented by an adaptive turning light element, with the left element illuminating right-hand bends and the right element illuminating left-hand bends. The rider benefits from even better illumination of the road when cornering, making it even safer to ride in the dark.

Two LED additional headlamps mounted on the left and right at approximately the level of the crankshaft are also available as ex-works options for further enhanced visibility at night and recognisability in road traffic.

5. Design and colour concept.

“The second generation of the S 1000 XR is much more masculine and sharply drawn in its design. Sharp **edges and highlighted beads ensure the machine's precision is clearly conveyed in visual terms, too.”** Andreas Martin, Designer S 1000 XR-

Sport, Tour and Adventure – stylistically blended by BMW Motorrad**.**
In terms of styling, too, the new S 1000 XR fully reflects its role as a multi-talented machine in the area of sports, touring and adventure. It combines the powerful character strengths and superior qualities of the BMW Motorrad GS, touring and sports segments to create a unique synthesis: Adventure Sport. As such it is positioned as a versatile player, combining elements of a BMW GS with supersports genes as well as the proverbial touring capability of a BMW motorcycle. The new S 1000 XR combines character strengths and qualities from each of these three areas to create a unique blend of emotion and function.

Completely new bodywork with unique, dynamic design and optimised wind and weather protection.
The new S 1000 XR underlines its strong character with dynamic proportions, continuing to deploy the unique sculptural surface design. Solutions from the touring and GS sectors combine with sporty elements to give the bike a powerful presence in terms of its overall appearance, embodying its wide range of possible uses. The dynamic appearance of the new S 1000 XR is supported by richly contrasting design features. Even more than in the predecessor model, this so-called layering results in an impressive plasticity and three-dimensionality of the fairing elements. In addition, the dynamically designed side trim parts underline the sporty flair of the new S 1000 XR. In conjunction with its slim lines, the lightness and agility of the new S 1000 XR are given clear emphasis.

Almost every design element reflects the distinctive character of the new S 1000 XR, blending sports, touring and adventure, conveying its emotional appeal and versatility, and delivering an impressive statement. Further developed elements from the BMW Motorrad GS family such as the flyline, the suggestion of the legendary “beak” and the comparatively lavish spring travel and high ground clearance give the new S 1000 XR a robust and comfortable appearance that is generally reserved for adventure bikes. In

combination with the upright riding position and the intelligent storage concept, the proverbial BMW Motorrad touring qualities are by no means neglected. For example, the new S 1000 XR has a toll map compartment in the fuel tank cover that can be handled reliably even when wearing gloves. Further storage space is provided by a 1.8-litre compartment under the passenger seat.

Optimised aerodynamics and significantly improved rider protection are ensured by means of a tight knee grip in the fuel tank area, where the thighs and shins are now even better protected from wind and weather. The new S 1000 XR also offers even better protection in the areas of the abdomen, upper body and shoulders than its predecessor. A new windshield adjustment function, which is very easy to operate, also enables the windshield to be locked into two different positions – even while riding. Reduced turbulence in the helmet area of the rider and front passenger is another positive effect of the newly designed windscreen. The comfort windshield, available as an optional extra, is 50 mm higher, meeting the need for even greater wind protection.

A design that is both dynamic and functional, with high-quality details.

The two headlamp elements of the new S 1000 XR are arranged in a U-shape and are symmetrical in appearance for the first time. The symmetry has been borrowed from the new S 1000 RR, but here it is interpreted distinctively, emphasising the performance of the in-line 4-cylinder engine.

The slim and light rear section rises dynamically to the back, thereby providing a visual expression of the agility and manoeuvrability that are typical of the new S 1000 XR. The rear silencer, which has also been completely redesigned, not only allows a high degree of banking freedom, it also reflects an even sportier, more dynamic design style. As before, it allows new side cases to be fitted with optimum storage volume. The rear frame is designed to accommodate not only the side cases but also a luggage bridge – tried and tested storage solutions from the BMW Motorrad touring segment which address the desire for sport and adventure. One special technical feature is the floating suspension of the side cases on a new, self-centring holder made of lightweight magnesium which ensures perfect riding stability, especially at high speeds.

The elaborately designed fork bridge is glass bead blasted and gives the rider's workplace a high-quality, technical touch. The tapered aluminium tubular handlebars combine optimum control and solidity with an elegant shape.

Two colour and surface variants for Adventure Sport characters that are different but both powerful.
The new S 1000 XR also reflects its distinctive character in two different colour schemes: in the basic finish Ice Grey and also in Racing Red/White Aluminium metallic matt, which is available at an extra charge.

Ice Grey: In the Ice Grey colour scheme, the new S 1000 XR primarily emphasises its dynamic touring qualities. In combination with black contrasting surfaces, the new S 1000 XR also has a particularly elegant appearance.

Racing Red/White Aluminium: In this colour combination, the new S 1000 XR signals its sporty DNA. With striking red and black contrasting surfaces, the new S 1000 XR calls for a dynamic riding style in this finish, while the side panel in contrasting White Aluminium further underlines the sporty qualities of the new S 1000 XR in conjunction with a dynamically designed graphic.

6. Equipment program.

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

Options.

• **Touring Package:** Preparation for navigation unit, luggage bridge, centre stand, hand protector

• **Dynamic Package:** Dynamic ESA Pro, Shift Assistant Pro, Keyless Ride, heated grips, cruise control.

• **Carbon Package:** M Carbon front mudguard, M Carbon rear mudguard with chain guard, M Carbon side parts, left/right.

• Headlight Pro (incl. turning light and daytime riding light icon, where legally permitted)
• RDC
• Intelligent Emergency Call (incl. remote service)
• M forged wheels
• M lightweight battery
• Design option wheels (not for M forged wheels)
• LED additional headlight.
• Rider's seat, low/high
• Windshield, high
• DWA alarm system
• Lowered suspension

Original BMW Motorrad Accessories.

M Performance Parts.
- M oil filler neck
- M rider footrests, left/right
- M passenger footrests, left/right
- Lift stand mount
- M chain tensioner

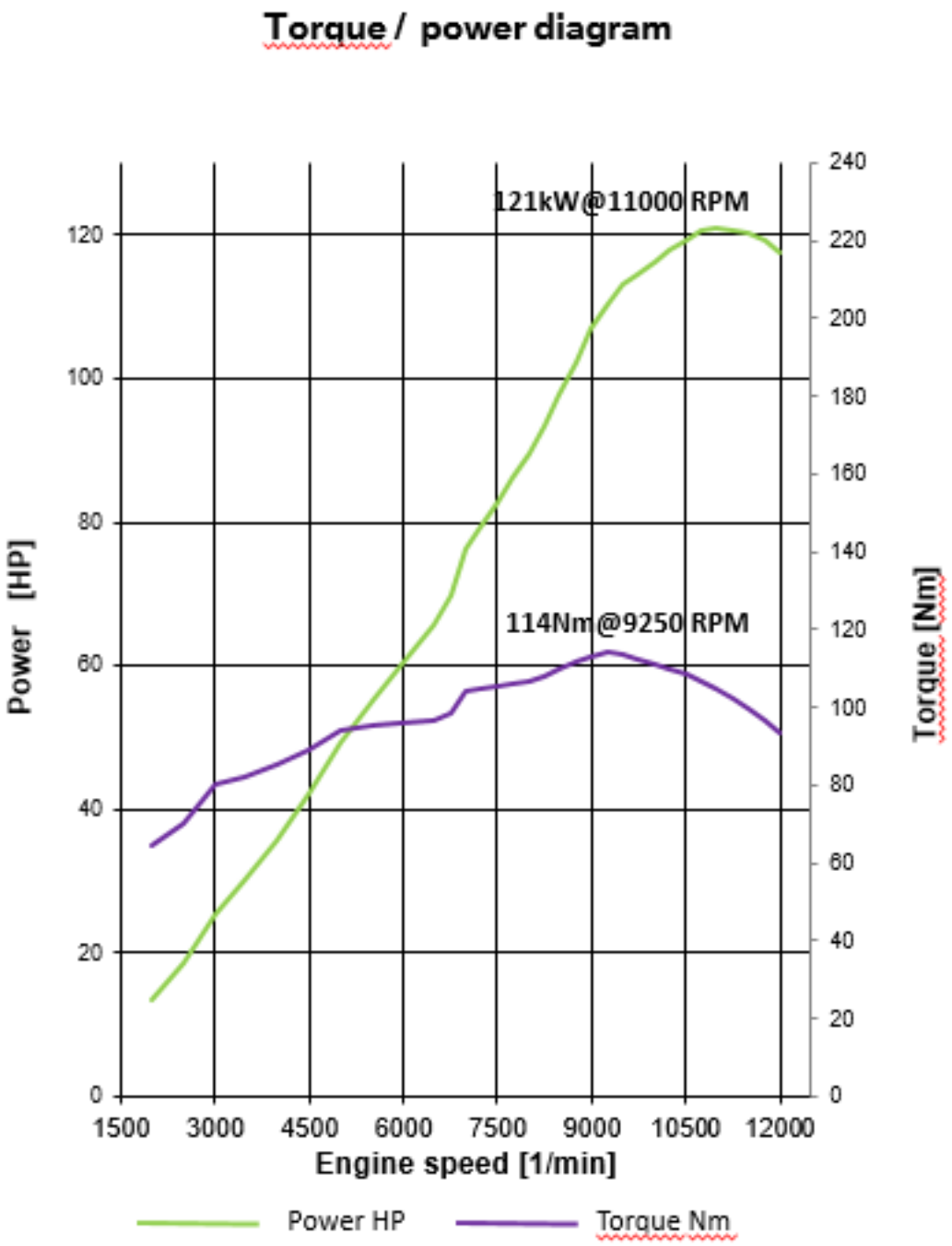
- M carbon fibre ignition lock cover
- M Carbon cockpit interior trim, left/right
- M rider's seat Sport
- M Carbon engine guard
- M axle protectors
- M engine protector, left

Storage program
- Touring case, left/right
- Case liners, left/right
- Topcase, small, 30 l.
- Liner for topcase
- Back pad for topcase, small
- Tank rucksack, large
- Tank rucksack, small
- Softbag, small, 30 l – 35 l
- Softbag, large, 50 – 55 l.
- Motorcycle cover

Ergonomics, comfort and design.
- Fuel tank pad
- Comfort seat (850 mm)
- Seat, high (860 mm)
- Seat, low (820 mm).
- Windshield, tinted
- Windshield, high, tinted
- Windshield, low, tinted

Safety, electrical system and electronics.
- Retrofit set – navigation preparation
- Navigator VI
- Brake disc lock with alarm system
- Retrofit set – alarm system
- Protective glass for 6.5-inch TFT screen
- First aid set, large
- First aid set, small

7. Engine output and torque.



8. Technical specifications

			BMW S 1000 XR
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	493
Battery		V/Ah	12 / 9, maintenance-free
Headlamp		W	LED low beam twin headlamp with projection module
			LED high beam with projection module
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
Secondary ratio			(2.647)
Suspension			
Frame construction type			Aluminium composite bridge frame, self-supporting engine
Front wheel control			Upside-down telescopic fork, slide tube diameter 45 mm, Dynamic ESA, damping electronically adjustable
Rear wheel control			Aluminium underslung double-sided swinging arm with central spring strut, Dynamic ESA, damping electronically adjustable
Spring travel, front/rear		mm	150/150
Wheel castor		mm	116
Wheelbase		mm	1 552
Steering head angle		°	65.1

		BMW S 1000 XR
Brakes	Front	Twin disc brake, floating, Ø 320 mm, radial 4-piston fixed calipers
	Rear	Single-disc brake, Ø 265 mm, 2-piston floating caliper
ABS		BMW Motorrad ABS Pro (part integral)
Traction control		BMW Motorrad DTC
Wheels		Standard: Die-cast aluminium wheels Aluminium forged wheels optionally available
	Front	3.50 x 17"
	Rear	6.00 x 17"
Tyres	Front	120/70 ZR17
	Rear	190/55 ZR17

Dimensions and weights		
Total length	mm	2 333
Total width with mirrors	mm	850
Seat height	mm	840
DIN unladen weight, road ready, fully fuelled	kg	Standard: 226
Permitted total weight	kg	450
Fuel tank capacity	l	20

Performance figures			
Fuel consumption (WMTC)		l/100 km	(6.2)
CO2		g/km	144
Acceleration	0-100 km/h	s	(3.3)
Top speed		km/h	200