

# The new BMW S 1000 RR. Contents.



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# 1. Overall concept. (Short version)



## **The new BMW S 1000 RR – the ultimate sports companion.**

The new BMW S 1000 RR is receiving its world premiere at the InterMot 2014 motorcycle fair. With refined torque delivery and peak torque of 113 Nm (83 lb-ft), an increase in engine output of 4 kW (6 hp) to 146 kW (199 hp), plus a reduction in weight of 4 kg to 204 kg with a full tank of fuel and Race ABS (making allowances for equipment), the superbike that first debuted in 2009 is entering a new generation. Besides eliciting even sharper performance from the new S 1000 RR, particular attention was also paid to designing the bike to be even more rider-friendly. Whether it is used for everyday riding, flitting through bends on country roads or being put through its paces on the race track – the new S 1000 RR excels in every respect.

## **Optimised drivetrain for even greater performance and rideability.**

The enhanced performance of the new RR in terms of drive power can be attributed to the re-engineered cylinder head with new duct geometry, new intake camshaft and even lighter intake valves. Furthermore, an airbox with a modified capacity combines with an intake system with shorter intake lengths to make mixture preparation more effective than ever and give the new S 1000 RR added punch. A further key contributing factor to the improvement in power and torque characteristics is the new exhaust system, which now dispenses with a front silencer and weighs around 3 kg lighter. Rideability and response from standstill both benefit from an increase in torque upwards of approx. 5,000 rpm, a more linear torque curve, as well as a wide torque plateau that allows the rider to summon up almost maximum pulling power between 9,500 (112 Nm) and 12,000 rpm (113 Nm / 83 lb-ft).

## **New frame structure and chassis geometry for superior riding precision and even better handling. Further improved Dynamic Damping Control (DDC) from the HP4 as an ex-works option.**

Chassis-wise, the new RR has been honed with the introduction of a new, lighter frame structure offering an optimised blend of rigidity and flexibility. Together with the optimised chassis geometry featuring redefined values for the steering head angle, wheel castor, wheelbase and swingarm pivot point, it promises even better handling, increased traction and unequivocal feedback, particularly when riding at the limit. The tasks of wheel suspension and damping continue to be performed by fully adjustable spring elements, but with modified negative spring travel for more banking clearance and greater

agility. As a factory-fitted option, the new S 1000 RR can also be specified with the new improved version of the electronically controlled Dynamic Damping Control (DDC) suspension – already familiar from the HP4 – that provides the basis for a chassis set-up with absolutely no compromises.

**Three riding modes as standard, plus two more available for fine-tuned adjustment by opting for the Pro riding mode feature.**

To enable optimum adaptation to the prevailing riding conditions, the new RR bike already comes with three riding modes as standard: “Rain”, “Sport” and “Race”. If the Pro riding mode option is selected, these can be supplemented by the two additional modes “Slick” and “User”. The Pro riding mode option also features Launch Control for flawless racing starts as well as the programmable pit-lane speed limiter for sticking exactly to the pit-lane speed limit. When this feature is activated, it has the additional effect of producing the impressive soundtrack familiar from the world of motorcycle racing. The HP Gear Shift Assist Pro, which can likewise be ordered as an ex-works option, enables lightning-fast clutchless upshifting and downshifting.

**Refined control system set-up. Dynamic Traction Control (DTC) with precision calibration in seven +/- steps.**

The new RR already leaves the factory with Race ABS (semi-integral) as well as Automatic Stability Control (ASC) included as standard. In conjunction with the optional Pro riding mode feature, it can be equipped with Dynamic Traction Control (DTC) including banking sensor and precision calibration. All control systems have been retuned and further improved in terms of their control precision and characteristics.

**First ever superbike with cruise control (optional). Innovative instrument cluster design, new electrical system and lighter battery.**

For the first time, the RR is now also available with an electronic speed control for staying within the current speed limits (ex-works option).

The multifunctional instrument cluster comprises a new dial for the analogue rev counter as well as a redesigned LCD display offering a far greater array of functions.

The new S 1000 RR furthermore features a new electrical system and a more powerful sensor box, along with a smaller battery weighing around 1 kg less.

**Design that is more dynamic than ever with stunning colour schemes.**

Last, but by no means least, there is the completely restyled bodywork that speaks an even more dynamic design language. The principle of the asymmetric headlight arrangement on the outgoing model has been retained

as a characteristic distinguishing feature, yet the headlights have been repositioned and restyled to ensure that the new RR is recognisable as “new” at first glance. The dynamic design with its sporty, aggressive feel is given further impact by colour schemes with three very individual characters: Racing Red / Light White, Black Storm metallic and the BMW Motorsport colours.

### **Highlights of the new BMW S 1000 RR:**

- Increased power output and torque: 146 kW (199 hp) at 13,500 rpm and 113 Nm (83 lb-ft) at 10,500 rpm.
- Even better rideability thanks to increased torque from approx. 5,000 rpm upwards as well as a more linear curve. A broad plateau of peak torque available in the rev range from around 9,500 up to 12,000 rpm.
- Re-engineered cylinder head with new duct geometry, new intake camshaft and even lighter intake valves.
- New intake system with shorter intake lengths, larger airbox and full E-gas ride-by-wire.
- Reduction in weight of 4 kilograms to 204 kg with a full tank of fuel (making allowances for equipment).
- New exhaust system weighing around 3 kilograms lighter without a front silencer.
- Riding modes “Rain”, “Sport” and “Race” as standard plus the option of the Pro riding mode with two additional modes, “Slick” and “User” (configurable), for optimum adaptation to riding conditions.
- Launch Control for flawless starts as part of the optional Pro riding mode feature.
- Pit-lane speed limiter for maintaining an exact speed in the pit lane as part of the optional Pro riding mode feature.
- New, lighter frame structure with an optimised blend of rigidity and flexibility for more traction, greater precision and clear feedback.
- Refined chassis geometry for even better handling, increased traction and unequivocal feedback at the limits of performance.
- Fully adjustable spring elements with optimised negative spring travel for more banking clearance and greater agility.
- Further improved version of electronic Dynamic Damping Control (DDC), familiar from the HP4, as an ex-works option.
- Race ABS with optimised set-up.
- DTC traction control with precision calibration in 7 +/- steps.
- HP Gear Shift Assist Pro for fast clutchless upshifting and downshifting as an ex-works option.
- New electrical system with a more powerful sensor box and lighter battery.
- Electronic speed control as an ex-works option.
- More sophisticated instrument cluster with extended array of functions and wide variety of information.

- Completely restyled bodywork for an even more dynamic design language.
- Innovative colour schemes with three individual characters: Racing Red / Light White, Black Storm metallic and BMW Motorsport.
- Extended range of optional extras and special accessories available ex-works.

## 2. Drivetrain.



### **New benchmarks for output and torque.**

The water-cooled four-cylinder in-line engine, together with its intake and exhaust system, underwent extensive modification and redesign work to prepare them for use on the new RR. Output now peaks at 146 kW (199 hp) at 13,500 rpm, an increase of 4 kW (6 hp) on its predecessor. Maximum torque has risen slightly from 112 to 113 Nm (83 lb-ft) and comes on line at 10,500 rpm. The usable rev range has been widened considerably on the new RR, meaning that near-peak torque is on tap constantly between around 9,500 (112 Nm) and 12,000 rpm (113 Nm / 83 lb-ft). The result is even punchier start-off characteristics and pulling power. Maximum engine speed remains unchanged at 14,200 rpm.

### **Re-engineered cylinder head with new duct geometry, new intake camshaft and even lighter intake valves.**

The principal development objective for the new S 1000 RR was to further improve on its predecessor's already outstanding power and torque figures and combine this with enhanced rideability for superb all-round performance.

With this aim in mind, the geometry of the intake and exhaust ducts was modified while the cams on the intake camshaft were given a fuller contour. These measures are further reinforced by lighter intake valves (2 g less per valve) and valve springs that have been adapted accordingly.

In a quest to reduce friction losses, the cylinder barrels that are integrated into the top half of the engine block now undergo slide honing. The top half of the block continues to accommodate the compact and lightweight six-speed gearbox as well, whose shift precision is now sharper than ever.

### **Improved intake system with shorter intake lengths, larger airbox and full E-gas ride-by-wire.**

The intake system also underwent some extensive modifications with the aim of not just boosting maximum output, but also substantially upping torque delivery especially in the zone around the 5,000 rpm mark that is so important for performance dynamics. Consequently, the diameter and length of the intake manifold were recalculated and the throttle valves repositioned closer to the cylinder head. The combination of the redesigned intake ducts and the

reduced intake length results in an improved gas-exchange cycle, particularly at medium revs.

The power unit on the RR bike still features variable intake lengths. For this, a servomotor attached to the airbox is used for map-controlled variation of the intake duct length in two stages. When the revs pass 11,500 rpm, the short intake channels best suited towards generating maximum power are enabled.

Apart from enabling the rider to operate the throttle with far less effort, the inclusion of a full E-gas ride-by-wire system, or “electronic throttle”, also paved the way for a new, considerably smaller servomotor for the throttle valves. This in turn made it possible to enlarge the airbox capacity and allowed it to be shaped symmetrically for all four cylinder units in order to optimise power and torque delivery. The far larger air intake in the top section of the fairing also helps to ensure an even more effective supply of intake air.

**Brand-new exhaust system without front silencer that is approx. 3 kg lighter.**

The exhaust system for the new RR underwent a complete redesign with the overriding objective of further increasing power and torque output. As before, it is made from stainless steel and incorporates two three-way catalytic converters as well as electronically controlled interference pipe valves.

The previous front silencer has been dispensed with for the new S 1000 RR, however, and the new system features a rear silencer with a dB eater and twin-pipe design. With a view to increasing gas speeds, the manifold diameter has been reduced and, at the same time, the exhaust back-pressure lowered. Improved gas-exchange cycles, increased torque at medium revs and superior power output are the result. Apart from the improvement in the performance figures, the new exhaust system has also shaved a remarkable 3 kg or so off the weight.

The new S 1000 RR also stands out clearly from its predecessor acoustically speaking, with a distinct shift towards lower frequencies resulting in a deeper, fuller sound.

**“Rain”, “Sport” and “Race” riding modes as standard, plus Pro riding mode as an option for optimum adaptation to riding conditions.**

The new RR comes equipped as standard with the three riding modes “Rain”, “Sport” and “Race” as well as Automatic Stability Control (ASC) without banking sensor. The optional extra Pro riding mode features two additional riding modes, “Slick” and “User”, along with Dynamic Traction Control (DTC)

including banking sensor and precision calibration in seven +/- steps for maximising safety and performance when accelerating. In addition to this, the Pro riding mode also includes a Launch Control function for flawless racing starts as well as a programmable pit lane limiter for sticking to the set speed limit in the pit lane.

In **“Rain” mode**, output is 138 kW (187 hp) (previously 120 kW [163 hp]), while torque is limited to a maximum of 108 Nm (80 lb-ft). Throttle response becomes gentler to suit the operating conditions on wet roads. When riding in the wet, the Automatic Stability Control (ASC) or optional Dynamic Traction Control (DTC) take action very early, before the grip threshold has been reached, and work in unison with a safety-focused Race ABS setting and a soft DDC electronic damper control set-up to ensure supreme safety even when riding in the most adverse weather conditions.

For use in dry conditions, **“Sport” mode** puts the engine’s full power of 146 kW (199 hp) on tap, at the same time as providing direct throttle response, just like in the “Race” and “Slick” riding modes. This riding mode has been developed for use on country roads in particular. In this setting, the ASC or DTC traction control systems intervene later in view of the much more favourable grip conditions, allowing the rider to safely power out of bends for maximum riding pleasure out on the road.

The **“Race” mode**, meanwhile, has been specially devised for use on race tracks as well as country roads offering perfect grip conditions. Here once again, the rider can enjoy full engine power combined with direct throttle response. The Automatic Stability Control (ASC) continues to be set up for road operation. However, because it factors in the data on banking angle, the optional Dynamic Traction Control (DTC) is more geared towards riding on the limit, allowing it to accommodate an extremely sporty riding style.

The new RR can additionally be ordered ex-works with the Pro riding mode option, which adds two extra riding modes: “Slick” and “User”.

All modes can be activated by the rider using a selector switch on the end of the right handlebar. To confirm the selected mode, all the rider has to do is briefly close the throttle. To enable the additional “Slick” and “User” modes, however, the supplied coding plug under the seat must be used.

The **“Slick” mode** is primarily designed for riding on the race track with racing tyres. With this mode activated, the DTC traction control is again set up for extremely sporty performance, but also makes allowance for the tyres’ higher friction coefficient and a very sporty riding style.



Finally, the **“User” mode** gives riders the option of configuring the RR as they please for engaged sporty riding. Quite apart from the two possible throttle characteristic curves for varying throttle response, this mode also allows the rider to compile an individual set of control characteristics for the Race ABS, Dynamic Traction Control (DTC) and electronically controlled Dynamic Damping Control (DDC) suspension from a range of predefined settings, and thereby configure their own personal riding mode. As in “Slick” mode, the DTC traction control can be individually adjusted while on the move in seven +/- steps.

The complete RR set-up configured in “User” mode, comprising the rider’s selected settings for Race ABS, DTC (slip thresholds + wheelie tendency), engine (throttle response + torque) and DDC, can be easily activated on the move at the push of a button. As a result, riders are able to see how their programmed “User” set-up compares to the “Slick” configuration. This means that, for the first time, it is now possible to compare two different set-ups of the same function (e.g. DTC) while riding the bike without the need for a pit stop.

Although the above-mentioned control systems for the RR represent a valuable aid for the rider, thereby providing a major safety boost, they are unable to change the laws of physics. The bike’s physical handling limits can still be exceeded as a result of misjudgement or rider error, which can lead to a fall in extreme cases.

### **Further improved Dynamic Traction Control (DTC) with precision calibration in seven +/- steps.**

The Dynamic Traction Control (DTC) system was redeveloped for use on the new RR to further enhance its control precision. In “Rain” or “Sport” mode, it is now able to offer even greater handling stability in the wet and in the dry respectively. In “Race” mode, meanwhile, the rider enjoys improved forward propulsion together with high handling stability. Wheelies are not suppressed immediately; rather, they are brought back under control gently. In the “Slick” and “User” modes, on the other hand, the focus is placed entirely on forward propulsion, while front-wheel lift detection is deactivated, making wheelies possible.

Just as on the HP4, it is now also possible to adapt the Dynamic Traction Control (DTC) to any changes in grip conditions while on the move in “Slick” mode by using the “Slick +/- DTC” rocker switch on the left handlebar controls. This enables the rider to effectively react to ambient conditions, such as air and track temperature, change in tyre grip over the course of use, as well as road surface conditions.

The adjustment range extends from -7 to 0 to +7. 0 corresponds to the basic RR setting in “Slick” mode, while -7 reduces the degree of corrective control substantially, making it possible to let the bike slide far more. By contrast, in the +7 setting DTC intervenes far more noticeably.

**Launch Control for flawless racing starts as part of the Pro riding optional extra.**

In conjunction with the optional Pro riding mode feature, the new RR offers its rider a Launch Control function in “Slick” and “User” mode that provides effective assistance with racing starts. It is activated when stationary with the engine idling by holding the start button pressed for more than three seconds. Activation is indicated in the instrument cluster display.

The Launch Control works by limiting the engine’s torque by just enough to ensure that the maximum transferrable drive torque is available at the rear wheel when the rider pulls away in first gear. The Launch Control’s parameters are programmed for a rider weight of 75 kg and a maximum rev speed of 9,000 rpm at stationary.

When the rider shifts into second gear, the engine torque is adjusted to reflect the change in ratio, ensuring that the maximum transferrable drive torque continues to be channelled to the rear wheel during this phase too.

Once the speed reaches 70 km/h (44 mph), the rev speed limiter is deactivated. The Launch Control and accompanying gear-dependent reduction in engine torque are disengaged as soon as third gear is selected or the banking angle exceeds 30 degrees. The system is likewise deactivated if the rider switches off the ignition, stalls the engine or switches to a different riding mode.

**Pit-lane speed limiter for maintaining an exact speed in the pit lane as part of the Pro riding mode optional extra.**

The Pro riding mode option also allows S 1000 RR riders to limit their speed when entering the pit lane in all riding modes.

The rider carries out the initial activation and programming of the pit-lane speed limiter in the set-up menu. It is then engaged while riding in first gear by pressing the start button while twisting the throttle at the same time. Even if the rider opens the throttle twist grip fully, ignition interruption limits the engine revs to the pre-programmed threshold so that the resulting bike speed cannot be exceeded. If a shorter or longer secondary transmission ratio is fitted, the rider can increase or lower the engine rev speed required for a limit of e.g. 60 km/h (approx. 40 mph) accordingly. When the start button is

released again, the RR accelerates with maximum power. The way in which the pit-lane speed limiter interrupts ignition has the added benefit of generating a distinctive S 1000 RR soundtrack even when in the pit lane.

## 3. Chassis.



Endowing the new RR with uncompromising super-sports abilities involved more than just honing the drive technology for maximum performance: the bike's supreme riding dynamics are also down in no small part to its chassis technology par excellence.

### **New, lighter frame structure offering a superior blend of rigidity and flexibility for more traction combined with greater precision and unequivocal feedback.**

The centrepiece of the chassis continues to be an aluminium bridge frame that is welded together from four individual cast pieces, with the engine tilted forward at an angle of 32 degrees and integrated into it as a load-bearing element. Prior to being fitted on the new RR, however, the main frame underwent a redesign and was given a new, lighter rear section.

The trio of main frame, main frame rear section and swingarm were furthermore re-engineered with a view to optimising the blend of rigidity and flexibility and thereby boosting traction at the same time as achieving greater precision and even better feedback.

### **Refined chassis geometry for even better handling, increased traction and crystal-clear feedback at the limits of performance.**

The overriding objectives when developing the chassis for the new RR were to further improve rider feedback from the front end, make the bike easier to handle and increase the mechanical grip of the rear wheel for greater traction.

The steering head angle was therefore increased by 0.5° to 66.5° without any change in the yoke offset, while the fork overlap of the immersion tubes was reduced to 6 mm. This resulted in a shortening of the wheel castor by 2 mm to 96.5 mm. At the same time, the swingarm pivot point was lowered by 3 mm and the wheelbase lengthened by 15 mm to 1,432 mm.

The new chassis geometry makes for vastly improved rider feedback from the front wheel and, as a result, the feel for the front end as a whole. Moreover, the new S 1000 RR boasts even better handling qualities, handles even more precisely and offers even more traction and feedback from the rear wheel, especially when riding at the limit. The handlebar width has been increased slightly by 5 mm on each side.

### **Fully adjustable spring elements with optimised negative spring travel for more banking clearance and greater agility.**

Modifications were also made to the spring elements with the aim of further improving and honing the chassis characteristics. The central spring strut therefore still features adjustable spring preload and shock compression and rebound, but now measures 42 mm longer. The same easy-to-use ten-click scale has been adopted for adjusting compression and rebound.

Whereas the rebound damping range is identical to the predecessor's, the damping range for shock compression has been widened slightly. The spring strut can thus be fine-tuned to perfection – even when dealing with terrain subject to subtle distinctions, such as short jolts or long undulating surfaces. Total spring travel at the rear axle is 120 mm. Besides adapting the spring rate, the positive/negative spring travel from 36 to 84 mm was also revised, with negative spring travel now 4 mm less than before.

Front wheel location on the new S 1000 RR is likewise perfectly in keeping with its superior performance abilities. As before, this task is handled by an upside-down fork with 46 mm stanchions, excellent braking stability and crystal-clear feedback. The upside-down fork is fitted with cartridge inserts comprising separate hydraulic piston and cylinder systems, and allows adjustment of both the spring preload and shock compression and rebound. Here again, the sensitive response characteristics, wide adjustment range and enormous damping reserves offer supreme handling dynamics, even when powering round a race track. Total spring travel is 120 mm. For use on the new RR, the positive/negative spring travel from 40 to 80 mm was again recalibrated. Negative spring travel has been reduced by 5 mm compared to the outgoing model.

The reduction in negative spring travel means that the new S 1000 RR is now around 5 mm higher at both the front and the rear at standard ride height, resulting in even more banking clearance. These modifications also helped to enhance the bike's agility and the feel for the front wheel.

### **Dynamic Damping Control (DDC) – electronic damping adjustment as an ex-works option.**

The electronically controlled suspension Dynamic Damping Control (DDC) first debuted on the BMW HP4 in 2012 and has now undergone extensive reworking and adaptation in house at BMW Motorrad to ready it for the RR.

With Dynamic Damping Control (DDC), the upside-down fork at the front and the spring strut at the rear are able to adapt the damping dynamically to suit the prevailing riding conditions, such as rapid changes of direction in chicanes

or negotiating bumps in the road surface. The chassis system therefore reacts automatically to manoeuvres, such as braking, accelerating and cornering, as well as to the state of the road surface, and sets the appropriate damping for the situation in hand by means of electrically controlled damper valves. There is no longer any need to compromise when it comes to the chassis set-up, as a result of which DDC also makes it possible to maximise traction, allowing the engine's power to be converted into forward propulsion as effectively as possible.

The damper valves are actuated by the DDC control unit on the basis of the following data and information: spring travel and damper piston speed, speed of travel, throttle valve setting and brake pressures. The sensor box for the Dynamic Traction Control (DTC) system furthermore relays the roll angle and roll rate as an indicator of the current banking angle. The damper adjustment valves take less than 10 milliseconds to react.

The spring/damper units were configured with the aim of further consolidating the race track prowess of the new RR while retaining its outstanding comfort levels. For this, the valve characteristic responsible for the build-up of damping force was modified. Compared to the HP4, the low-speed damping has been lowered and the high-speed damping raised, while the DDC algorithm has also been adapted. In addition, the bearing spring rates at both front and rear have been increased.

The basic DDC settings are linked to the riding modes "Rain", "Sport", "Race" and "Slick". In "Rain" and "Sport" modes, DDC is set up for a plush, pleasant degree of damping, though without seeming too bouncy. This "ROAD" damping setting is best suited to country roads with a poor to good tarmac surface.

The "Race" setting, on the other hand, has been configured with country roads in excellent condition and race tracks in mind. The DDC damping setting "DYNAMIC" is ideal for such situations, with a higher level of basic damping compared to "ROAD". With the "Slick" riding mode engaged, meanwhile, the "TRACK" DDC damper mapping provides optimum assistance for use on the race track with an even fuller and tauter damping setting. In this mode, the spring/damper units give the rider wonderfully clear feedback on the current riding situation at all times.

The chassis set-up can furthermore be customised in all riding modes. Riders of the new S 1000 RR can make adjustments either on the move or while stationary. As with a mechanical system of adjustment, the customer is able to

tune the suspension to be softer or stiffer, but at the simple push of a button. The settings range from -7 (soft) to +7 (stiff).

With the HP Race Calibration Kit that is available as a special accessory, these adjustments can even be preconfigured bend by bend at a race track.

### **Race ABS with optimised set-up for even safer braking.**

The semi-integral Race ABS system included as standard on the new S 1000 RR is also a more advanced version. Braking stability has been increased in “Rain” and “Sport” modes with no loss of braking power. In conjunction with this, the rear-wheel lift detection has been reconfigured so that the rear wheel lifts less noticeably during braking phases. This setting is best suited to country roads.

The rear-wheel lift detection has also been reprogrammed for “Race” mode, which is designed for use on dry country roads in excellent condition. Rear-wheel lift detection has been reduced and front brake power increased at the same time. If the rider brakes powerfully and with feeling, rather than sharply and aggressively, the Race ABS can react at the point when the axle load shifts forwards, enabling it to brake at just the right moment. In this phase, the rear wheel rises only slightly and is effectively kept balanced in the air. This riding mode allows the rider to get close to the bike’s maximum stopping power and therefore hone their own braking skills to great effect.

Rear-wheel lift detection is deactivated in “Slick” mode for maximum braking performance on the track. The ABS function at the rear wheel is also deactivated to allow perfectly executed braking drifts into a bend.

With the HP Race Calibration Kit that is available as a special accessory, it is also possible to modify the settings for the DTC, DDC, engine, Launch Control and Gear Shift Assist (gradient of ignition interrupt).

### **HP Gear Shift Assist Pro for fast clutchless upshifting and downshifting as an ex-works option.**

The HP Gear Shift Assist Pro enables upshifts to be made without operation of the clutch, which translates into flawless acceleration with barely any interruption in power flow. It also allows downshifts without operation of the clutch or throttle valve in the load and rev speed ranges that are of relevance for riding. Riders can therefore enjoy lightning-fast gear shifts with minimal clutch work.

Clutchless downshifts are of particular benefit for riders when powering around a race track as they do not need to use their left hand to operate the

clutch, it can be kept in exactly the same position on the handlebar. Undesirable load-alteration effects at the rear wheel are also lessened considerably, ensuring that it stays on track even more accurately than before.

The new S 1000 RR also caters as standard to many track riders' preference for a "reversed" shift pattern, with first gear up and second to sixth gears down. An additional mounting on the shift lever for the shift linkage allows conversion in next to no time.

These are just some of the aspects that highlight the constructive exchange of information with the Customer Sport department, BMW Motorrad HP Race Support.





## 4. Electrics and electronics.

### **First-ever superbike with electronic speed control. New electrical system and more powerful sensor box for an extended range of functions. Lighter battery.**

The new S 1000 RR is the first-ever superbike to boast an electronic speed control, which makes it easy for the rider to adhere to the prevailing speed limits.

The new RR inherits the electrical system already familiar from the S 1000 R, providing the platform for a more extensive range of functions. As a result, it has been possible to equip the new RR with a full E-gas ride-by-wire system, whose principal benefit for the rider is the reduced effort required to turn the throttle grip. The inclusion of the new electrical system has also made way for new optional features, such as a speed control, the HP Gear Shift Assist Pro, as well as the "User" riding mode that forms part of the Pro riding mode option.

By using the same sensor box fitted on the BMW HP4 it has been possible to achieve notable improvements in the Dynamic Traction Control's (DTC) applications, especially the front-wheel lift detection.

Installing a smaller battery with a 7 Ah capacity, meanwhile, has meant a weight saving of around 1 kg.

### **More sophisticated instrument cluster offering a wider array of functions and information.**

Just like the rest of the new S 1000 RR, the instrument cluster is also geared even more closely to super-sports performance. The unit on the BMW HP4 provided the technical basis. For optimum clarity, however, the LCD display on the new RR has 640 segments instead of the previous 320, while the analogue rev counter now features a new and even easier-to-read scale.

Besides showing a digital readout of the speed, selected riding mode, settings for Race ABS, DTC and DDC as well as menus, all manner of additional information can be called up in the display (depending on the optional extras fitted). These include, for example:

- Current banking angle to left/right.
- Maximum banking angle achieved to left/right.

- Current deceleration rate in  $m/s^2$ .
- Maximum deceleration rate achieved in  $m/s^2$ .
- Intake air temperature.
- Torque reduction by DTC.
- Speed warning (“SPEED” appears in the display when a predefined speed is exceeded).
- Average speed.
- Average fuel consumption.
- Trip 1 and 2.
- Remaining range.
- Total mileage.

For riders who plan to use the new RR on the race track, the Race info menu provides yet more, highly useful data:

- Lap time and lap distance.
- Lap-specific speeds (min., max., average).
- Active riding mode for each lap.
- DTC setting for each lap.
- Maximum banking angles to left/right for each lap.
- Maximum DTC torque reduction for each lap.
- Maximum deceleration rate for each lap.
- Number of gear changes for each lap.
- Average throttle twist grip position for each lap.
- Total laps, total riding time and total distance.
- Best ever lap.

## 5. Body, design and colour scheme.



To some extent, the launch of the S 1000 RR in 2009 marked the dawn of a new era for the superbike segment. Boasting all the technical credentials to deliver maximum performance, as well as rigorous lightweight engineering and rider assistance systems such as Race ABS and traction control that were unheard of in the super-sports realm, this machine gave a whole new meaning to the term superbike. The spectacular performance figures for the RR were reflected in its unmistakable, exceedingly dynamic design. Styling elements such as the “split face” with its asymmetric headlight arrangement and the gill-type air outlets on the right side of the fairing turned into key signature features with outstanding recall value.

### **New bodywork for an even sportier design language.**

The latest-generation S 1000 RR also lends visual expression to its freshly honed performance abilities. Its design is even more focused, sharper and more sophisticated than its predecessor's, and clearly conveys the renewed increase in power at first glance. The distinctive RR line, which slopes down at the front before rising up steeply from the fuel tank back towards the tail, has been endowed with even more dynamic flair on the new RR. It gives the bike an even more electrifying feel at the same time as dividing it visually into two planes, with the technical area at the bottom and the ergonomic section on top.

The lightness which accompanies all the performance feats of the new RR is captured beautifully by its completely redeveloped bodywork. The super sporty nose-down tail-up pose seems to be propelling the new RR forward while still stationary with yet more vigour than before. At the same time, it has adopted an even more dynamic interpretation of the familiar asymmetrically styled side fairing sections with the distinctive gills on the right and the split face with its asymmetric headlight arrangement.

Features which enhance the technical prowess of the new RR include the redesigned cooling air outlet on the left, which works in unison with a precision air-guiding seam to improve dissipation of the cooling air and the bike's aerodynamics. The air-deflecting winglets are now integrated into the new fairing more neatly than previously. These aerodynamic aids also reduce pressure on the arms at high speed.

### **Reversed headlight asymmetry and a more aerodynamically designed windshield.**

The new RR is instantly recognisable from the front. Both the slender silhouette, with an enlarged air intake positioned directly in the zone of highest dynamic pressure for an even better intake air flow rate, and the asymmetrically designed headlights are highly reminiscent of the design of the outgoing model's front end and clearly have the genetic makeup of the RR. A new windshield has been fitted as part of the measures to further streamline the bike's aerodynamics.

The asymmetrically designed headlights have swapped sides, with the dipped-beam lamp now on the right and the high beam on the left. The asymmetric arrangement of the headlights has been deliberately defused somewhat at the bottom, where the outlines of the two headlight units now match each other. The characteristic asymmetry of the upper sections has been retained, however, as a clear distinguishing feature. As a result, the new RR can be easily identified as a member of the BMW RR family, yet it also clearly stands out from its predecessor as a brand new model.

The tail end tapers to a point while rising up sharply at the rear, giving this part of the new S 1000 RR an extremely light and sporty appearance. The rear seat upholstery picks up on the forms around it and also comes together in a point at the rear to further reinforce the declaration of sporting intent. The flat and dynamic looking pillion seat cover (optional) adds to the racing feel.

The new-look engine spoiler rounds off the sporty, road-hugging silhouette at the bottom. Featuring openings for dissipating heat as standard, or alternatively available in an enclosed version made from lightweight carbon (two special accessory variants), it lends added visual impact to this machine's extraordinary performance credentials.

The new S 1000 RR is the picture of dynamic performance and agility even when viewed from above. The slim aluminium tank means ideal ergonomics for the sports rider, while the plastic airbox cover includes a specially formed recess that makes space for the lower section of the helmet when riding at high speed, enabling the rider to adopt an even more streamlined position.

### **Instrument cluster area with a thoroughly sporty and technically refined look and feel.**

The instrument cluster on the new S 1000 RR makes no secret of its racing genes either. Besides a large analogue rev counter with new scale markings, there is also an LCD display for providing a wealth of information hitherto unknown in this segment – even lap times and banking angles can be

recorded. Meanwhile, the yoke milled from high-strength forged aluminium will delight all technology connoisseurs.

### **Colour schemes with three individual characters.**

The sporty and dynamic presence of the new S 1000 RR is translated into a colour scheme with a choice of three colour combinations. The bike is available in Racing Red / Light White, Black Storm metallic as well as the BMW Motorsport colours.

#### **Racing Red / Light White.**

This distinctly sporty colour scheme takes on an even more dynamic flair on the new-generation RR. The rich Racing Red colour forms a dramatic contrast with the Light White finish on the sides of the fuel tank trim and the top of the side fairing sections, while the painted model graphic superimposed on top of the fuel tank paintwork adds a real touch of class.

#### **Black Storm metallic.**

In the dark Black Storm metallic variant, the sporting statement broadcast by the new RR has a particularly laidback feel to it. Rather than being painted, the side fuel tank trim and the top of the side fairing sections have a sophisticated grained finish. The model graphic is located on the side fairing section below the BMW logo.

#### **BMW Motorsport.**

When this colour combination is specified, the new RR is emblazoned in the colours of BMW Motorsport (Lupin Blue metallic, Light White, Racing Red) and brings both its pedigree and its racing genes to the fore. Here, the model graphic can be found on both the fuel tank and on the motorcycle's tail.



## 6. Equipment range.

### **Optional equipment and special accessories.**

A comprehensive range of optional equipment and special accessories is available for further customisation of the new BMW S 1000 RR. Optional equipment items are factory-fitted and integrated in the production process. Special accessories can be fitted by the BMW Motorrad dealer or customers themselves, which means the motorcycle can also be retrofitted with equipment.

### **Optional equipment.**

- Race Package: Pro riding mode, DTC, cruise control.
- Dynamic package: DDC, LED turn indicators, HP Gear Shift Assist Pro, heated grips.
- HP forged wheels.
- Design option wheels (with red rim lining, lacquered).
- Anti-theft alarm system.
- Pillion seat cover.

### **Special accessories.**

#### **HP Parts.**

- HP carbon fairing sections top left/right.
- HP carbon tank cover left/right.
- HP carbon airbox cover.
- HP carbon engine spoiler.
- HP Race carbon engine spoiler.
- HP carbon front mudguard.
- HP carbon rear mudguard.
- HP carbon chain guard.
- HP carbon heel guards.
- HP pillion passenger foot pegs.
- HP rider foot peg system incl. HP carbon heel guards, adjustable ergonomics.
- HP Gear Shift Assist Pro.
- HP folding brake and clutch lever.
- HP hand lever protector.
- HP forged wheels.
- HP titanium exhaust system.
- HP carbon bracket for titanium exhaust system.

### **HP Race Parts.**

- HP lap timer.
- HP Race data logger.
- HP IR transmitter/receiver 2D.
- HP Race calibration kit 3.
- HP Race cover kit.
- HP Race power kit.
- HP Race brake pads.
- HP Race brake bleed valve.
- HP Race brake bleed assistant.
- HP Race handbrake lever with remote adjustment.
- HP Race wiring harness.
- HP Race chain tensioner.
- HP Race seat.
- HP Race tyre warmers.
- HP Race pit-stop carpet.

### **Storage accessories.**

- Tank rucksack.
- Rear bag.
- Small softbag.
- Large softbag.
- Luggage roll.
- Lashing strap.
- Luggage spider.

### **Design.**

- Pillion seat cover.
- LED indicators.

### **Sound.**

- Akrapović sport silencer.
- HP titanium exhaust system.
- HP carbon bracket for HP titanium exhaust system.

### **Ergonomics and comfort.**

- Comfort rider's seat.
- Comfort pillion seat.
- High windshield ("bubble").
- Tinted windshield.
- High tinted windshield.
- Heated grips.

### **Safety.**

- Anti-theft alarm system.
- Speed limiter.
- Engine protection left/right.
- Axle crash pads.
- Pro riding mode (DTC and 2 riding modes: “Slick” and “User”).
- BMW Motorrad warning triangle.
- Large first aid kit.
- Small first aid kit.

### **Maintenance and technology.**

- Sport 2 workstand front/rear.
- Swingarm adapter for Sport 2 workstand.
- BMW Motorrad battery charger 230 V.
- BMW Motorrad battery charger 110 V.
- BMW Motorrad battery charger for UK.
- Puncture repair kit for tubeless tyres.
- Indoor motorcycle cover.
- Motorcycle tarpaulin.

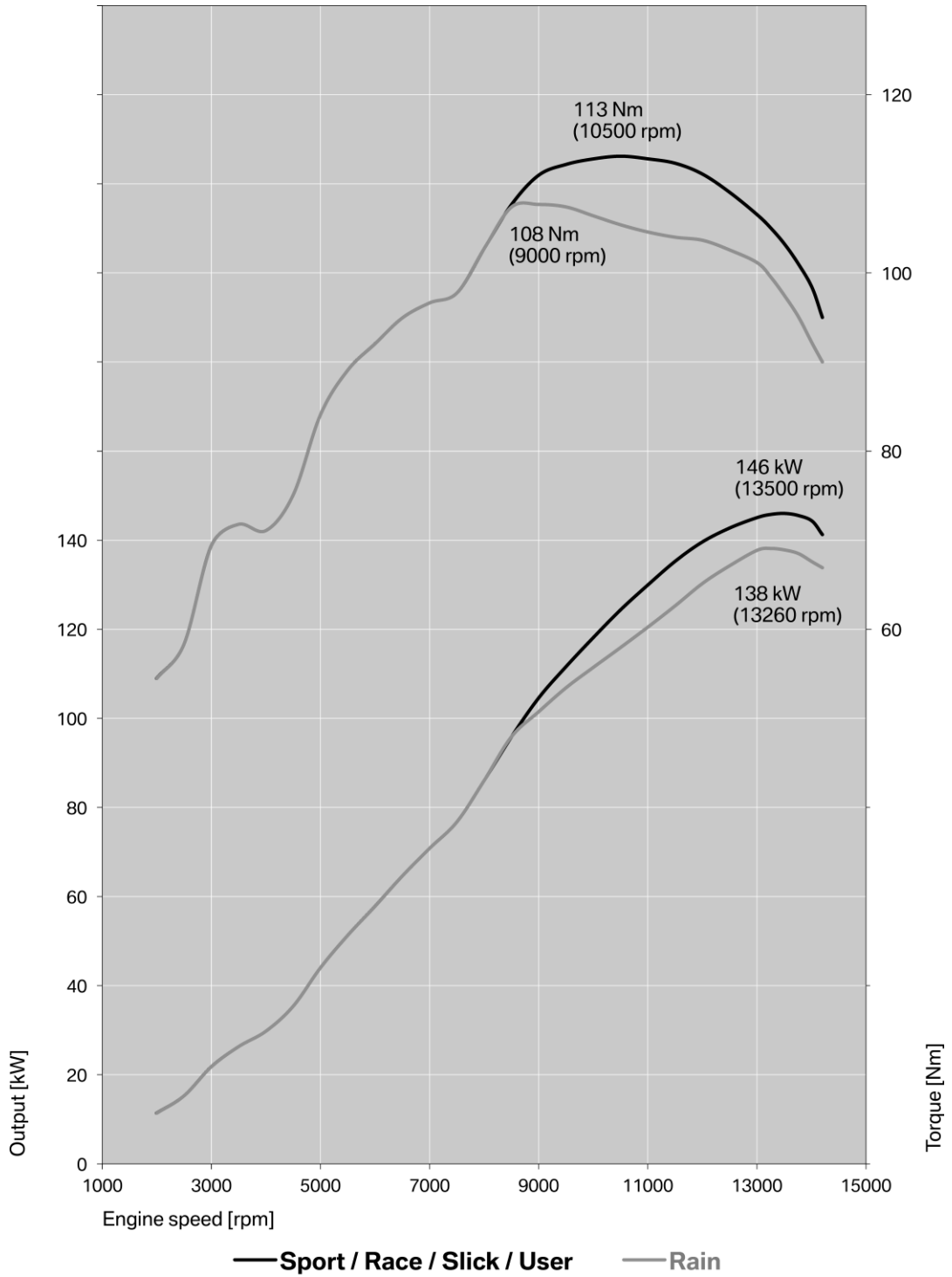
### **Rider equipment.**

- DoubleR Race AIR\* suit.
- Double R suit.
- DoubleR jacket.
- DoubleR Skin undersuit.
- DoubleR boots.
- DoubleR gloves.
- Race helmet.
- Plastic knee sliders.

\* homologated solely for race track use



## 7. Engine output and torque.



## 8. Technical specifications.



| <b>BMW S 1000 RR</b>                |   |   |
|-------------------------------------|---|---|
| <b>Engine</b>                       |   |   |
| Displacement                        | cc  | 999   |
| Bore/stroke                         | mm  | 80/49.7   |
| Output                              | kW/hp   | 146/199   |
| at                                  | rpm   | 13 500  |
| Torque                              | Nm  | 113   |
| at                                  | rpm   | 10,500  |
| Type                                | water-cooled in-line four-cylinder engine   |   |
| Compression/fuel                    | 13.0: 1/at least premium unleaded (95 RON)  |   |
| Valve actuation                     | DOHC (double overhead camshaft),<br>valve actuation via single rocker arms  |   |
| Valves per cylinder                 | 4   |   |
| Ø Intake/outlet                     | mm  | 33.5/27.2                                       |
| Ø Throttle valve                    | mm  | 48  |
| Engine management                   | BMS-X   |   |
| Emission control                    | closed-loop 3-way catalytic converter   |   |
| <b>Electrical system</b>            |   |   |
| Alternator                          | W   | 350   |
| Battery                             | V/Ah  | 12/7, maintenance-free                          |
| Headlight                           | W   | low beam H7 12 V 55 W<br>high beam H7 12 V 55 W |
| Starter                             | kW  | 0.8   |
| <b>Power transmission – gearbox</b> |   |   |
| Clutch                              | multi-disc anti-hopping oil-bath clutch,<br>mechanically operated   |   |
| Gearbox                             | constant mesh 6-speed gearbox   |   |
| Primary ratio                       | 1.652   |   |
| Transmission ratios                 | I   | 2.647   |
|                                     | II  | 2.091   |
|                                     | III   | 1.727   |
|                                     | IV  | 1.500   |
|                                     | V   | 1.360   |
|                                     | VI  | 1.261   |
| Final drive                         | chain   |   |
| Transmission ratio                  | 2.647   |   |
| <b>Chassis</b>                      |   |   |
| Frame construction type             | aluminium bridge frame, engine self-supporting  |   |
| Suspension, front                   | upside-down telescopic fork, stanchion diameter 46 mm,<br>spring pre-load, adjustable for bump and rebound<br>SA DDC: electronically adjustable damping     |   |
| Suspension, rear                    | aluminium double-strut swingarm with central spring strut,<br>spring pre-load, adjustable for bump and rebound<br>SA DDC: electronically adjustable damping |   |
| Spring travel, front/rear           | mm  | 120/120   |
| Wheel castor                        | mm  | 96.5  |
| Wheelbase                           | mm  | 1438  |
| Steering head angle                 | °   | 66.5  |

| <b>BMW S 1000 RR</b> |       |  |
|----------------------|-------|--|
| Brakes               | front | floating twin-disc brakes,<br>Ø 320 mm, radial four-piston fixed callipers |
|                      | rear  | single-disc brake, Ø 220 mm, single-piston floating calliper               |
| ABS                  |       | BMW Motorrad Race ABS<br>(part-integral, can be switched off)              |
| Traction control     |       | standard: BMW Motorrad ASC<br>optional: BMW Motorrad DTC                   |
| Wheels               |       | cast aluminium wheels  |
|                      | 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  | 2050 |
| Total width with mirrors                  | mm  | 826  |
| Seat height                               | mm  | 815  |
| DIN unladen weight, road ready, full tank | kg  | 204  |
| Permitted total weight                    | kg  | 407  |
| Fuel tank capacity                        | ltr | 17.5 |

#### **Performance figures**

|                  |          |       |
|------------------|----------|-------|
| Fuel consumption |          |       |
| 90 km/h          | l/100 km | 5.7   |
| 120 km/h         | l/100 km | 5.9   |
| Acceleration     |          |       |
| 0–100 km/h       | s        | 3.1   |
| Maximum speed    | km/h     | > 200 |