

First Impression

BMW S1000RR Introduced at Miller WSBK Races



by Dave Searle

In a market segment where style counts for a lot, the new S1000RR's asymmetrical face looks like Cubist sculpture.

BMW FINALLY REVEALED all the secrets of the company's new S1000RR superbike to a select group of American journalists at the US round of the World Superbike Championship held in Tooele, Utah. No, we didn't get to ride it, but we did get to see Troy Corser and Ruben Xaus in action on the racing versions.

First of all, you should know that BMW is really betting big on this bike. It regards the Japanese share of worldwide sportbike sales, roughly 85% of 100,000 bikes a year, as a market with real profit potential for a company famous for its high performance automobiles. It chose the ubiquitous in-line four-cylinder layout because it essentially demands comparison with the products of Honda, Kawasaki, Suzuki and Yamaha.

Of course, our first thought was that if BMW followed its traditional strategy and priced the S1000RR closer to what Ducati or Aprilia would charge for a supersport, such comparisons were pointless. But sit down for a real shock! The biggest news of all is that BMW will be very competitive on price, with the base model selling for \$13,800, (\$1410 more than Yamaha's R1, the highest priced Japanese supersport). BMW's stated goal is to take 10% of the supersport market, and although the first production models won't arrive until early next year, they'd like their dealers' order books full before then.

Certainly the motorcycle BMW has created doesn't leave anything on the table in terms of power-to-weight. Claiming 193 hp @ 13,000 rpm with a redline at 14,200—the highest in the class and weighing just 450 lbs. wet (lighter than the Japanese fours), or 455 lbs. with ABS, the bike surely won't be lacking for speed.

And BMW hasn't built something unusual just to be different this time. They admit that they carefully examined the competition and where they couldn't improve on a given system, they would simply adopt the best current practices.

Here's the technical lowdown: Powered by a DOHC, four-valve liquid-cooled in-line four, the engine uses the most over-square bore/stroke ratio in the four-cylinder class; 80.0mm x 49.7mm to allow the largest valves in class: 33.5mm intakes and 27.2mm exhaust, all 16 poppets made of titanium. The intake valves are set at 11.2° to the cylinder centerline, the exhaust are

set at 13.3° for a 24.5° included angle. The camshaft uses a combination gear/chain drive, with a half-speed gear reduction from the crankshaft to turn the chain sprockets, allowing smaller cam sprockets up top to create a more compact cylinder head. BMW's Formula One-inspired finger-follower valve lifter system is naturally employed, only in this instance all the fingers pivot from the forward side of the head and are made even smaller and lighter.

The block slants forward at a 32° angle to optimize weight distribution, and the transmission shafts are stacked to reduce motor length to accommodate the longest possible swingarm for enhanced traction.

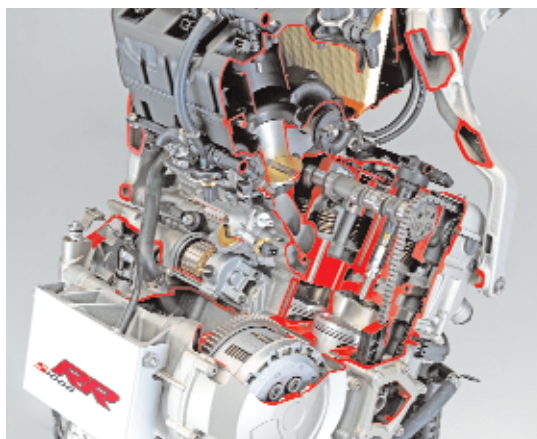
The crankshaft is a forged steel 180° type with even firing intervals. The rods are long relative to the stroke length, which reduces piston side thrust and also enhances combustion efficiency and smoothness. The rods use BMW's "cracked" big end design, which allows the two parts to key together when bolted up for excellent dimensional alignment that resists shifting.

The intake system uses variable length velocity stacks, like the Yamaha R1 and R6. Coaxial funnels can be joined to create extra length for enhanced lower-rpm running and alternately separated so the shorter bottom funnel creates optimal high-rpm tuning. Dual injectors reside in each intake tract, the lower set handling rpm approximately to the torque peak, and the upper "showerhead" set joining in to supply sufficient fuel above that point.

The stainless steel exhaust system is also innovative, using three butterfly control valves; one in each crossover between the headpipes and a third at the silencer. A belly-mount muffler centralizes mass, and is claimed to be the lightest unit in the class. The complete exhaust system scales just 23.6 lbs., BMW says.

The clutch is, of course, a ramp-style back-torque limiting type that BMW calls an "anti-hopping" design.

The throttle system is a "fly by wire" type called "E-gas" which is designed to work hand in hand with BMW's Dynamic Traction Control and high-performance ABS systems, which will be optional extras. BMW, famous for its electronic riding enhancements, just had to incorporate ABS and the company's system is almost 20 lbs. lighter than Honda's CABS design.



Note the stacked intake trumpets and super long reach sparkplugs. BMW claims 193 hp @ 13K rpm.



The chassis arrangement is quite conventional for the class.

Multiple ABS settings can be selected at the handlebar, to correspond to various traction situations; either Rain, Sport or Race, as well as a competition setting—Slick (tires, that is)—which can be programmed via a connection with the ECU. Engine tune is likewise adjustable, with either Rain (hp reduced to just 150!), Sport (a full 193 hp) or Race (ultra responsive) settings, depending on the occasion. The traction control is similarly configurable, and the HP Gearshift Assistant or electric quick-shifter is also optionally available. BMW is producing all the electronics in-house, and the traction control function is provided primarily by adjusting the throttle butterfly openings. The main throttles are very large, with 48mm butterflies, controlled by stepper motor in response to decisions by the motor electronics, as advised by the rider's throttle grip movements.

Ram air pressure is taken from the center of the front fairing for maximum pressure and passes through the steering head to the 7.9 liter airbox for the least restrictive path to the intakes. In fact, BMW claims it has the most effective ram air arrangement in the class. To save weight, the ram air tunnel also acts as the support for the instruments, mirrors, headlights and horn.

The chassis is a robot-welded aluminum fabrication that arches over the engine, to keep the package narrow. The subframe is a bolt-on type that uses square-section members. The swingarm is as long as possible, 23.35" from pivot to axle, to minimize drive chain geometry effects on the suspension. The wheelbase is adjustable between 55.69" and 57.46".

The suspension is fully adjustable, naturally.

Brakes are from Brembo, using 320mm front discs attached without carriers to the middle of the wheel spokes (to reduce unsprung weight) held in radial-mount four-piston calipers. A 220mm disc and single-piston rear brake is fitted, both ends mated up with braided stainless lines.



Above: Reuben Xaus in action aboard the race version S1000RR at Miller. Note his one-finger front brake lever. The bike had good speed but struggled getting off the corners.



The attractive dash layout features a shift light next to the tach.

The bike's styling is the work of Ola Stengaard and features Design Chief David Robb's favored asymmetry for a distinctive if controversial look. The two headlights are different shapes, making for an homely face, and the fairing sides also use different arrangements of slots and gills. The taillight is a ray-gun burst of faceted shapes, lit by LEDs. The aerodynamics have been closely examined in the BMW tech center to remove heat and reduce drag for maximum speed.

On Track

Ridden by Troy Corser, WSBK Champion in 1995 and 2006 and the talented Ruben Xaus, the recently assembled team has been hard at work, BMW taking on the world in motorcycle road racing competition for the first time in many years. There has obviously been a lot to learn, and for every significant move forward, the team finds that the field of competitors has also been making incremental improvements.

Although WSBK rules allow the use of Moto-GP spec engine management and traction control systems, which most are using, BMW is working hard to bring its own systems to the same level, and this may well be the biggest obstacle it faces. The WSBK machines are clearly having problems applying all their power to drive from corners. Engine mapping to smooth the power flow is also something that BMW has not been doing on its current production motorcycles (we have the dyno charts to prove it), so this is something else that may be a challenge. And while it is surely important to gather data and improve, it is also important to produce racing results that will inspire sales.

We love seeing BMW mixing it up in WSBK competition, and it has had some very encouraging results, but it still has a ways to go before we expect to see the S1000RR challenge for wins.

—Dave Searle



American fans were delighted by Texan Ben Spies' utter domination aboard the Yamaha R1. Just three laps into race two, only Michel Fabrizio on his Ducati could keep him in sight.