

Gsrx 600 Gsrx 750 Gsrx 1000: 2003 - 2005 (K3, K4, K5)



SUZUKI MOTORCYCLES Gsrx 600, Gsrx 750, Gsrx 1000 Generation 6: 2003-2005 (k3, k4, k5)

Gsrx 600, Gsrx 750, Gsrx 1000: the Gsx R 1000 teak the lead

The launch of the sixth generation of **Gsrx** marked a shift in **Suzuki's** emphasis on two fronts. One, the **Gsrx 1000** now took the upper hand in the development stakes.

Historically, the **Gsrx 750** led the march-arriving first, gaining the most recent technology, absorbing the lion's share of corporate pride-but by 2003 the **Gsrx 1000** was in the lead. Two, the **Gsrx 1000** represents another, more subtle shift for **Suzuki** engineering, in which the designers-the lucky guys who get to clothe these amazing machines-have more freedom of expression.

With this generation, the designs turned edgier, sharper, more aggressive looking than ever. What's more, the **Gsrx 1000 K3** would be the proving ground for a host of changes brought to the **Gsrx 600** and **Gsrx 750** for 2004.

In fact, nearly every upgrade to the smaller bikes appeared on the **Gsrx 1000** a year before.

But the real impetus for driving the **Gsrx 1000** to the head of development and, indeed, shortening its development cycle was competition both on the track and in the showroom. For the track, it was understood that Superbike racing would revert to allowing **1000** cc four-cylinder bikes in place of the **750s** that had been the limit since 1982.

In 2002, Yoshimura and Mat Mladin barely lost the AMA Superbike crown to Nicky Hayden aboard the Honda RC51. But it would be the RC's swan song of competitiveness with the change to **1000** cc fours.

To keep speeds in check, the AMA Superbike rules would require **1000** cc fours to have some additional limitations compared to the twins and triples.

For example, "Cylinder heads may be ported and machined, but altering of valve angles will not be permitted; aftermarket valves, springs, retainers, and other valve-train components will be permitted; valves must be stock size and same basic material as original equipment; aftermarket camshafts will be permitted, but earn lift and resulting valve lift must be no greater than stock.

"In addition, the "stock crankshaft must be retained, The only allowable modifications are balancing, polishing of bearing surfaces and attachment of accessory drives.

Homologated transmission gear sets (one optional set of ratios per approved model) will be permitted. Optional sets will be price-controlled and must be available to any legitimate AMA Superbike competitor.

Homologated fuel-injection throttle-body assemblies (one optional type per approved model) and aftermarket airboxes will be permitted. Modifications to throttle bodies will not be permitted. Optional throttle bodies will be price-controlled and must be available to any legitimate AMA Superbike competitor."

The thinking was simple: keep the liter bikes from sucking through massive throttle bodies, and the horsepower might not (and, it was hoped, would not) go through the roof.

In preparation for racing, **Suzuki moto** wanted to make a host of small changes to the **Gsrx 1000**, but its motivation was also to keep the bike at the forefront of open-class street bikes.

Suzuki engineers knew that Honda and Kawasaki were readying all-new models-the CBR 954 RR and the ZX 9 R had long since been vanquished-and rumor had it that Yamaha was ready with yet another push with the R1. It was the right time to make alterations to the **Gsrx 1000**. Heading the list was, as one might expect, a revised engine.

Despite the fact that the engine was already the strongest in the class by a healthy margin-all without moving from the original 988 cc displacement-it received significant alterations.

From the cam cover to the crankshaft, the engine is the same as the original **2001-2002 (K1-K2) Gsrx 1000's**, with a slightly longish stroke and modest bore, plus a gear-driven counterbalancer at crankshaft level to reduce vibration. But for the **Gsrx K3**, **Suzuki moto** aimed to reduce friction and internal losses, so a set of ports was let into the crank webs between the cylinders.

The concept here was that as one piston rushed down from top-dead center, the air in the crankcase below it had to have someplace to go. Traditionally, the trapped air would migrate downward into the oil pan but not without exerting a slight bit of force on the bottom of the pistons.

It was pumping loss, a form of drag and a consumer of precious horsepower. But for the **Gsrx 1000 K3** engine, portals were machined into the bottom of the cylinder bore between bottom-dead center and the top of the mainbearing saddle. They allowed crankcase pressure to migrate freely between the cylinders.

Other minor changes included an internal oil passage for the hydraulic earn-chain tensioner. **Suzuki moto** then turned its attention to the induction system, switching from individual dual-butterfly

throttle bodies to two paired units, which narrowed the area required under the airbox and fuel tank.

They featured revised-shorrer-taper between the secondary throttle valve and the primary. Four-hole injectors replaced single-orifice items for increased fuel flow. The injection system also got a smarter computer, with a 32-bit processor fed by a 22-pole trigger on the crank, replacing an eight-pole unit. This move gave the faster computer more data to work with so it could create finer gradations in the fuel and spark delivery. More accuracy is always better. They may seem like minor changes, but the big **Suzuki Gsxr** gained 10 horsepower at the rear wheel without sacrificing any of the midrange torque that road testers and enthusiasts loved so much about the original **Gsxr 1000**. Putting that power to the road was an entirely new frame.

Since the seminal redesign in 1996, the **Gsxr** has used a familiar frame technology-cast portions in the steering head and swingarmpivot area joined by welded sheets of stamped aluminum. For the different models, **Suzuki**'s engineers would specify more or less material thickness in strategic places or call out the addition of stiffeners for the larger bikes. But the overall look and technology were the same. Starting with the **Gsxr 1000 K3**, **Suzuki moto** made a bold move toward improved technology that promised lower weight and strategically increased stiffness. Where it had used stamped sheets of aluminum, the company turned to extrusions for the main side beams. Modern extrusion technology can make complicated shapes economically and with extremely good consistency.

While recasting the frame, **Suzuki**'s engineers improved the bike's handling by reducing rake by half a degree (from 24.0 to 23.5) and trail by 0.2 inch (3.8 to 3.6). Wheelbase remained the same.

At the same time, the **Gsxr 1000**'s suspension components took a major turn toward Superbike tech. Up front, the inverted Showa fork gained a new surface treatment on the sliders called Diamond Like Carbon (DLC). Intended to reduce seal friction (stiction), the DLC treatment was also something of a calling card for the **Gsxr** and a proud indication of how quickly racing technology could come to the street: the DLC idea was in Superbike racing just a couple of seasons before. Right next to the DLC stanchions were brakes that represented another bit of racing trickledown: radial-mount calipers.

The idea was simple: by configuring the caliper to mount directly to massive lugs at the bottom of the fork, overall rigidity went up, as did power and braking feel.

Increased caliper rigidity also allowed higher brake-line pressures and different pads to be used, all in the search for additional (and predictable) braking power. (A benefit to the race teams was that radial-mount calipers could be used with different-size rotors with the addition of small spacers that did little to compromise overall rigidity.)

Because the brakes were more powerful, the discs could be smaller and lighter. To make the bike feel more compact, the ergonomic profile was changed. The tank was shortened and narrowed slightly, which moved the rider forward and put a bit more weight on the front wheel.

This move followed a general movement in motorcycling at the time, as tinier bikes helped shrink the scale of displacement. Today's **Gsxr 750** feels like last year's **Gsxr 600**. A middleweight of four years ago would dwarf a **Gsxr 1000** today.

It's a continuation of Mr. Yokouchi's theme set on hyperspeed. Only now horsepower is comparatively easy to come by; the real trick is to keep the bikes along the lighter-is-better trajectory. In this redesign, **Suzuki moto** took a chance on the styling, whereas before every member of the **Gsxr** family wore the same clothes, the new **Gsxr 1000 K3** would be noticeably different.

(In fact, the previous generation of the **Suzuki Gsxr 600**, **Gsxr 750**, and **Gsxr 1000** had slightly different bodywork, but the overall effect was one of close family resemblances, quite deliberately.) Hiroaki Chosa was the designer who penned the **Gsxr 1000**'s detail shape. He's a big fan of fighter aircraft: "I would ride to work right by the Hamamatsu Air Base and see the fighters coming in to land. I loved that look.

It's so aggressive and purposeful."

Mr. Chosa successfully imbued the **Gsxr 1000** with those attributes while accepting the challenge of the engineering department, who wanted the ram-air ducts to move closer to the center of the fairing. (The **K1-k2 Gsxr 1000**'s were quite widely spaced by comparison.) "Aerodynamics pushed this part of the design," he acknowledges.

"I was given an overall inlet area to work with, but I was free to refine the shape."

The stacked headlights were intended to recall the **Gsxr Hayabusa 1300**, of course, but they share no parts with the **Gsxr 1300**. "I wanted a clean and aggressive look," Mr. Chosa says. As for the LED taillights, the shape became a natural extension of the now sharply raked tail section.

"But the tail is really just the headlight shape turned upside down," he says.

Suzuki moto surprised most industry watchers with the immediacy of the updates in only the third year of the bike's life. In comparison tests and on the racetrack, the new **Gsxr 1000 k3** dominated. Yoshimura and Mladin took another title in AMA Superbike. By every measure, the **Gsxr 1000** redesign was a smashing success and seemed to put it in a good position to defend the street bike crown as the much-anticipated liter bikes of 2004 were set to debut.

But first, **Suzuki moto** stood ready to release two **Gsxrs**, a completely new **Gsxr 600** and **Gsxr 750**.

Again, the company turned its engineering trends ninety degrees from what was expected. Before, all the **600s** were based on the **750s**-same size, based on the same engine cases, and so on.

This time around, seeing that the **600** class only continued to grow and that the **750** class was **Suzuki**'s for the taking, the emphasis turned instead to the middleweight. As a result, the **Gsxr 750**-unquestionably more like the **Gsxr 600** than ever-became extremely compact, just as the **Gsxr 600** fitted into the (small) box of a **600** cc Supersport.

Most technologies applied to the 2003 **Gsxr 1000** were visited upon the 2004 **Gsxr 600** and **Gsxr 750**.

New extruded-section main frame. Check. Radial-mount front brake calipers. check. More aggressive, angular styling.

Check. More power. Yes, indeed.

Although the bottom ends of both engines remained true to their predecessors, both bikes got new heads and the paired throttle bodies first seen on the **Gsxr 1000**. (The other injection upgrades, from a faster processor to a more accurate timing sensor, were applied here as well.)

The **Gsxr 600** received a new cylinder head of familiar architecture. The included valve angle was reduced to a thoroughly modern 22 degrees (from 28), allowing the intake ports to become straighter and more efficient. New pistons with flat tops worked with the smaller combustion chambers for a higher, 12.5:1 compression ratio.

And - the ultimate treat of technophiles - the sixteen valves were now constructed of superlight titanium. Yes, a production motorcycle-good for thousands of miles on the street and carrying a full warranty plus a competitive price tag-now had titanium valves.

Suzuki moto turned to them for extra durability at elevated revs, but that's not all. Lighter valves can handle more aggressive cam timing, and they do so with lighter springs. As you'd expect, the new **Gsxr 600**'s (and **Gsxr 750**'s) springs were lighter than the previous versions, which helped reduce frictional losses in the engine.

The upper piston rings were faced with a chrome-nitride plating to reduce friction. Crank main journals were reduced in width by 2 mm.

Once more, **Suzuki moto** had gone back to the precepts that built the first **Gsxr**: keep looking for improvements even in the smallest increments. In general specification, the **K4 Gsxr**'s engine wasn't very far down the development chain from the '03 bike's, but it made more power at higher rpm and was lighter, thanks in part to a comprehensive weight-reduction program that pared

weight from the high-strength cast-iron camshafts to the cylinder hold-down bolts.



Suzuki Gsrx 750-Gsrx
1100: 1985 - 1987



Suzuki Gsrx 750-Gsrx
1100: 1988 - 1991



Suzuki Gsrx 750-Gsrx
1100: 1992 - 1995



Suzuki Gsrx 600-Gsrx 750-
Gsrx 1100: 1996 - 1999



Suzuki Gsrx 600-Gsrx 750-
Gsrx 1000: 2000 - k1 - k2
- k3



Suzuki Gsrx 600-Gsrx 750-
Gsrx 1000: k3 - k4 - k5



Suzuki Gsx R 600-Gsrx
750-Gsrx 1000: k5 - k6 -
k7