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STREET AFTERTHOUGHT

Kawasaki instills even more of a track focus with its substantially revamped ZX-10R

FIRSTRIDE

BY KENT KUNITSUGU
PHOTOGRAPHY COURTESY OF KAWASAKI

EVEN IN THIS DAY AND AGE OF SPORTBIKES BOASTING PERFORMANCE that's barely a step away from the racetrack, manufacturers have still spent a significant amount of time making sure their sporting machines have acceptable street manners. After all, the majority of sportbikes still rarely ever see racetrack tarmac, so making an effort to prevent the casual street rider from being too uncomfortable or overwhelmed seems like basic business sense.

But when we asked project leader Yasuhisa Okabe how much racing influenced development of the '08 Kawasaki ZX-10R, he quickly revealed, "All of the ZX-10R's development took place on the racing circuit. Every change we made was for superior performance on the circuit first. All else was of secondary importance." Surely there were some alterations made for the street rider? "Hmm," he murmured, actually having to think hard about it. "Very little. Not much." Well, OK, then . . . guess that answers that question.





KAWASAKI ZX-10R

MSRP: \$11,549

ENGINE

Type: Liquid-cooled, transverse inline, DOHC 4-stroke four
 Displacement: 998cc
 Bore x stroke: 76 x 55mm
 Compression ratio: 12.9:1
 Induction: Keihin electronic fuel injection, 43mm throttle bodies w/oval subsections; two injectors/cyl.

CHASSIS

Front tire: 120/70ZR-17 Bridgestone BT-016
 Rear tire: 190/55ZR-17 Bridgestone BT-016
 Rake/trail: 25.5 deg./4.3 in. (110mm)
 Wheelbase: 55.7 in. (1415mm)
 Fuel capacity: 4.5 gal. (17L)
 Claimed dry weight: 395 lb. (179kg)

As if to reinforce that point, Kawasaki held its world press launch of the new ZX-10R at the Losail International Circuit in Qatar, where the opening event of the MotoGP season has been held the past three years. Two straight days of continuous racetrack lapping on a world-class circuit would reveal if the significant changes made to Kawasaki's liter-bike flagship had indeed improved its all-out performance. Qatar being situated out in the middle of the desert, good sportbike roads were obviously nonexistent, so street riding was out of the question.

BIG CHANGES

The design concept behind the new ZX-10R was to create the "ideal superbike racer [with engine and chassis performance to satisfy professional riders], which was then adapted into a high-level street-going model that could also be enjoyed by mid-level riders." The engine modifications were extensive, aimed at not only more power but also

improved control for the rider. Details can be found in the engine/chassis tech sidebar (page 34), but a brief overview shows that while the bore and stroke remain the same, very few engine components escaped the engineers' CAD/CAM knife. Biggest changes include dual injectors/oval subthrottle bodies, a new cylinder head, higher-lift cams, a 1kg-lighter crankshaft (with the same inertia by redesigned counterweights), a larger air-box and a reshaped ram-air duct.

The engine component that probably garners the most attention, though, is the new Kawasaki Ignition Management System (KIMS), which monitors various engine parameters and prevents spikes in engine rpm during acceleration (translated as wheelspin). However, despite initial appearances the KIMS is not a true traction-control system in a performance sense (see the KIMS sidebar, page 36, for more details).

An elevated level of feedback to the rider was high on the list in the chas-

sis development. While externally looking nearly identical to the previous unit, the twin-spar aluminum frame has been extensively revamped, with numerous changes intended to alter chassis rigidity in differing areas. Brakes and suspension received some upgrades, and even the ergos on the new ZX-10R were intended to improve feedback by increasing the number and size of the areas on the bike that come in contact with the rider while cornering. Check out the engine/chassis sidebar for the lowdown on the changes for 2008.

Overall styling of the new Ninja is obviously leaning toward the minimalist trend in MotoGP, where less surface area helps reduce the bike's susceptibility to sidewinds, as well as theoretically helping flickability at speed. The twin-underseat-exhaust styling trend is apparently dying fast, the '08 ZX-10R joining the under-engine chamber exhaust movement with a single orthogonal titanium silencer protruding from below the right side of the engine. Unfortunately the new exhaust is the main contributor to the additional eight pounds over the previous ZX-10R.

TRACK DAZE

For the two days of lapping at Losail International Circuit, Kawasaki outfitted the new ZX-10Rs we rode with Pirelli Diablo Supercorsa DOT race rubber. In an effort to display just how race-ready the new Kawasaki is, the first day was run on the standard off-the-rack Diablo Supercorsas, while the second day was run on a track-specific version (the World Supersport Championship has an event at Qatar, so Pirelli developed a tire especially for the track requirements) for even better traction on the tricky circuit. We were informed that American ZX-10Rs will come equipped with the new Bridgestone BT-016, the company's latest sport radial, which will replace the BT-014.

It was probably due to the Pirellis' taller profile that the new Kawasaki's ergos



Note the raised lip just before the leading edge of the upper fairing and windscreen; this generates a turbulent boundary layer of airflow that "sticks" to the rider longer for better aerodynamics. The turn signals in the mirror stalks direct airflow over the rider's shoulders.

KAWASAKI ZX-10R CHASSIS/ENGINE TECH



The rear subframe is now a two-piece aluminum die casting, with the rearmost section removable for racing purposes. The subframe now mounts directly to the main rear frame cross-member where the rear shock is mounted; Kawasaki claims that the more direct path to the rider improves feedback.



Freer-flowing catalyzers in both primary and secondary collectors clean up the Kawasaki's exhaust enough to pass EPA and Euro III emissions standards, while the pre-chamber and exhaust valve help quell noise.



Constructed from pressed-aluminum-sheet beams welded to a die-cast pivot/shock-mount section, the ZX-10R's swingarm is now braced on top instead of the bottom, presumably to make room for the under-engine exhaust. The swingarm pivot was lowered 2mm.

The radiator is narrower but taller than the previous unit to provide additional cooling capacity without adding aerodynamic frontal area. The water pump uses improved design borrowed from the ZX-14 to prevent cavitation during extended high-rpm use.



Throttle bodies now feature oval subthrottle plate sections for improved throttle response, and the ZX-10R finally gets secondary shower-style injectors this year for better top-end power. A straighter and larger ram-air intake tract combines with an airbox twice as large (from four- to eight-liter capacity, made possible by a flat-type fuel pump) to enhance volumetric efficiency.



The new cylinder head features reshaped intake and exhaust ports, with all titanium valves (previously only intakes were titanium) and the exhaust poppets are now 1mm smaller. The combustion-chamber shape is revised, and the intake cams feature 0.6mm higher lift, while the exhaust cam timing has been retarded slightly for improved top-end power.



Changes to the new frame's rigidity were achieved by switching internal sections of the pressed main spar areas (red) from concave to convex shape, in addition to a tube welded into each spar (yellow) and additional strengthening ribs added to the top interior of the swingarm pivot plates. The steering-head pipe was moved forward 10mm and lengthened by 20mm for increased rigidity, while the ram-air intake was straightened and enlarged for better efficiency.



The same adjustable (via different spacers/springs) slipper clutch is kept for the new ZX-10R, while shorter first, fourth and fifth gear ratios—plus a lower final-drive ratio due to a one-tooth-larger rear sprocket—help retain midrange acceleration lost from the more aggressive cams. Crankshaft is 1kg lighter but maintains the same inertia due to reshaped counterweights.



The radial-mount brake calipers now use two brake pads instead of four for less aggressive response, with different-size leading/trailing pistons to maintain even pad wear. The petal-type discs grow to 310mm from 300mm while becoming 0.5mm thinner. Disc carriers are now aluminum, with three more buttons per disc to spread load and heat better.

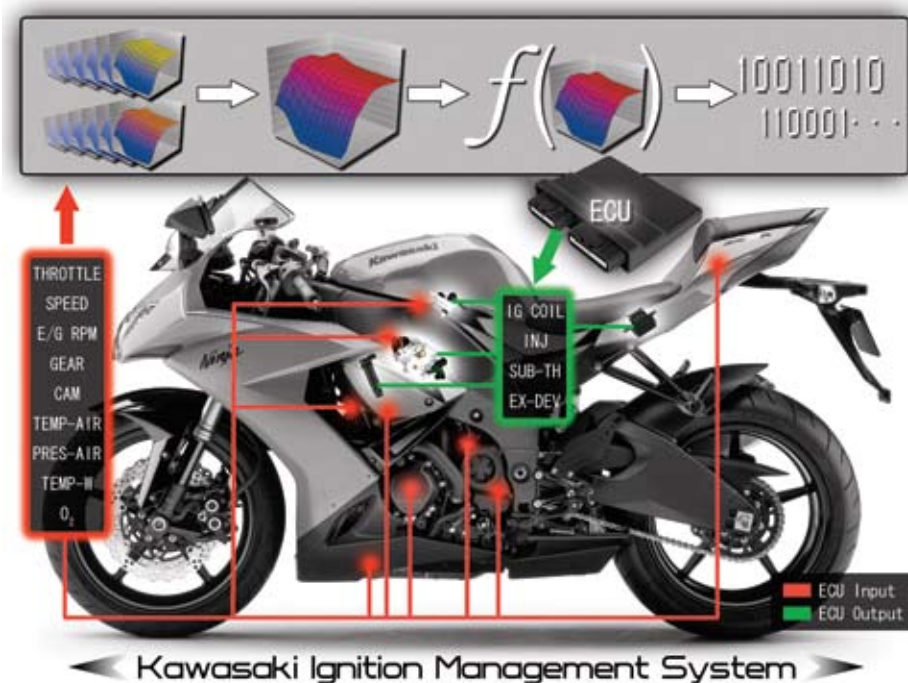
KAWASAKI IGNITION MANAGEMENT SYSTEM (KIMS)

Is it a true traction-control system?

When the first tidbits of news began trickling out about the '08 Kawasaki ZX-10R having an ignition management system that "curtails sudden spikes in engine speed for improved rider control," the immediate assumption from the public was "traction control." After all, traction control has been the buzzword in both MotoGP and World Superbike for the past couple of years, enabling racers to produce corner-exit drives and maintain a pace over the course of a race that normally would be very difficult. It would surely only be a matter of time before this rider-aid technology filtered down to production bikes. But is the Kawasaki Ignition Management System (KIMS) really a traction-control system?

In order to determine whether there is actual wheelspin occurring, you obviously need to be able to detect if one wheel is rotating faster than the other. The usual method of achieving this is with wheel-speed sensors. Because antilock braking systems require the same wheel-speed data, it was an easy transition to develop traction control (followed by "vehicle stability systems") and make them standard equipment on most automobiles. Motorcycles—especially sportbikes—haven't adopted ABS as quickly as cars, however, so the hardware and software isn't already there.

Without wheel-speed sensors, the only other reliable method of detecting wheelspin is to monitor rpm and determine if the rate of change during acceleration is excessive. With an automobile's mostly flat-profile tires this would be an easy task. The drastically different profile of a motorcycle tire, however, makes determining if a rapid rise in rpm is due to wheelspin or a sudden lean-angle change (moving from the center's taller circumference to the edge's



much smaller one, effectively changing gearing) a far more difficult job.

Complicating matters is that most racers want the ability to steer with the rear tire in certain situations by intentionally spinning it. This requires a host of other parameters besides rpm to be monitored, including throttle position, gear selection and speed, among others. Some of the more sophisticated systems in MotoGP have internal gyros to measure lean angle, as well as GPS to allow programming for different corners on the racetrack. All this requires incredibly complicated software and powerful processors to crunch the information and determine whether to intervene, at what point and to what degree.

The KIMS uses this basic method of monitoring the engine rpm's rate of change. By keeping track of other parameters such as throttle position, gear selection, air/engine-coolant temps and oxygen

levels in the exhaust (and doing all this every 0.02 seconds), the KIMS intervenes by retarding ignition timing when it senses an rpm spike. More than 500 different situation maps are stored in the ZX-10R's ECU, allowing a huge variety of options for the KIMS to use.

The caveat, however, is that it will only intervene at smaller throttle and lower rpm settings; big handfuls of throttle at higher rpm (such as when a rider wants to intentionally spin the rear tire) will override the system. This means that not only will the KIMS rarely intrude upon a rider on the track, it's also not a failsafe that will keep ham-fisted riders from ending up on their heads. We found the Kawasaki would easily spin up the sticky Pirelli Diablo Supercorsa DOT race rubber on Losail's superb pavement if provoked. "We want expert riders to have the freedom to ride the ZX-10R without electronics intruding on their technique," says ZX-10R project leader Yasuhisa Okabe.

So is the KIMS a real form of traction control? In a way, yes; we can see it helping with wet-weather traction on the street, keeping the rear tire from spinning unintentionally at slower speeds. Whether it will actually accomplish this will have to wait until we get our hands on a test unit back in the States, as we weren't able to engage it on the high-speed tarmac of Losail. But as an actual form of traction control in any type of performance sense, the KIMS doesn't fit the bill.

Will the race-kit ECU turn it into a full traction-control system? When we asked Okabe-san, he replied that while the race kit ECU would "allow an expansion of options available," the KIMS will still be nonadjustable and function basically the same way. We asked him when we might see real-time traction control on production sportbikes. His cagey reply was, "Maybe in the near future. ABS first . . . then maybe traction control soon after."

felt different. The rear end's raised ride height made the bars feel lower, but when I asked Okabe-san about it he said the ergo measurements are identical to the previous model. The seat is definitely narrower at the front, which makes the bike feel narrower, but the top of the fuel tank is flared out slightly to allow more contact with the rider's arm when leaned over, so the bike initially looks wider from the saddle.

Any impressions of large size immediately fade away once you begin to up the pace and flick the bike into a corner for the first time. The new ZX-10R steers much lighter with a much easier initial turn-in than the old model, especially in the faster turns. And this is despite the newer Kawasaki having more relaxed steering geometry and a nearly one-inch-longer wheelbase compared with the previous edition (25.5-degree versus 24.5-

degree rake angle, 110mm versus 102mm trail and a 55.7-inch versus 54.7-inch wheelbase). While some of this could be attributed to the DOT race tires fitted, it's enough of a difference that the race rubber couldn't be responsible for all of the new Ninja's nimbleness. There weren't really any places that were rough enough to tax the Kawasaki's stability, but we never encountered a hint of instability during two days of track riding.



A plethora of parts are included in the race kit available from Kawasaki dealers for those interested in competing with their ZX-10R.

Steering characteristics overall are nice and neutral (although again, we'll have to wait until we ride the bike on the stock Bridgestones for a final verdict) and very precise. Front-end feedback is also improved, and while some of that could be attributed to the DOT race rubber there's no doubt the increased trail helps in that regard.

One area where we had issues with the old ZX-10R was in the rear suspension department. The previous engine was definitely not lacking in steam, and its tremendous power potential tended to cause a lot of chassis pitch, especially squatting under hard acceleration. Attempting to tighten up the rear suspension to counter the squat tendency forced too many compromises with compliance, causing rear tire grip problems. Thankfully the new ZX-10R's rear-suspension-linkage ratio is more progressive with a better-matched spring rate, which helps keep the rear suspension from reacting too much to the engine power. We know the word "balanced" has been overused lately when describing current sportbike chassis, but the new Kawasaki's overall feel simply fits that description better than any previous ZX-10R in the past.



The new instrument panel has a UV-blocking glass to make the LCD display brighter, and the tachometer numbers are labeled better. An adjustable Öhlins steering damper helps quell headshake tendencies.

Oh, um, did we mention something about tremendous power potential? The previous-generation ZX-10R was definitely no slouch when it came to power, and with the new engine being upgraded with the usual hot-rodding tricks it's only reasonable to expect an increase in steam from the new Kawasaki's engine room. The more aggressive cams have brought the powerband up a bit, resulting in some steps to try and regain the lost midrange acceleration. Those include shorter ratios for first, fourth and fifth gear and a one-tooth-larger rear sprocket to drop the overall final-drive ratio even further. For the most part those steps have succeeded in keeping the Kawasaki's midrange acceleration from suffering too much. Only the lower portions of the powerband show some effects; at less than 5000 rpm, the ZX-10R feels weaker than before.

But we'd venture to guess that most riders of the new ZX-10R won't be spending much time below that rpm. The Kawasaki definitely comes alive at 7000 rpm and pulls hard to 10,000. At that point warp speed begins, and acceleration becomes fierce enough that definite care must be exercised in how the trigger is pulled on a weapon this serious; even with sticky race rubber, it's easy to get the rear tire to spin (proving that the KIMS does not intervene in those situations). Power continues building well past 12,000 rpm before tailing off just a bit before the rev limiter cuts the party right at the 13,000-rpm redline. Is the Kawasaki faster than the Suzuki GSX-R? That will have to wait until a direct comparison can be done, as it's too close to call.

Thankfully the ZX-10R's brakes are up to the task of bleeding off the considerable speed it can generate. Although the radial-mount calipers are basically unchanged, they now use two pads instead of four individual pads. Four pads usually provide a more responsive initial bite, and the newer brakes' response is indeed a bit softer, but nothing objectionable. If anything it provides a little less opportunity to upset the chassis with abrupt use of the brakes, and the same power, feel and progressiveness from the previous brakes remain. With the difference only in initial response, we had no complaints with the brake pad switch.

Interestingly the angular and minimalistic bodywork would lead many to believe that the Kawasaki's fairing doesn't work that well, but that wasn't the case at all. The fuel tank has a deep cutout so that the rider can tuck his helmet in as much as possible, and the unorthodox turn signals located in the middle of the mirror stalks are actually designed to deflect airflow from the rider's shoulders. We found the ZX-10R to be one of the few bikes we've ridden that provide a complete pocket of still air behind the fairing at high speed; no buffeting could be felt on our shoulders, arms or helmet.

WILL IT MAKE A GOOD STREETBIKE?

With no real time spent at street-legal speeds and conditions during the launch, there was no way to find out if the ZX-10R's racetrack pedigree compromises its streetability. But even that is a judgment call; most people in the market for the new Kawasaki won't really be concerned about ergos, vibration or wind protection. They'll only be interested in its performance. And in that area the \$11,549 ZX-10R definitely has the goods.

Is it enough to take the literbike crown this year? We'll soon have the contestants rounded up to find out. 