FREE from Fast Bikes

THE ART OF MOTORCYCLE ENGINEERING

Bi-SPOKE

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ISSUE 1

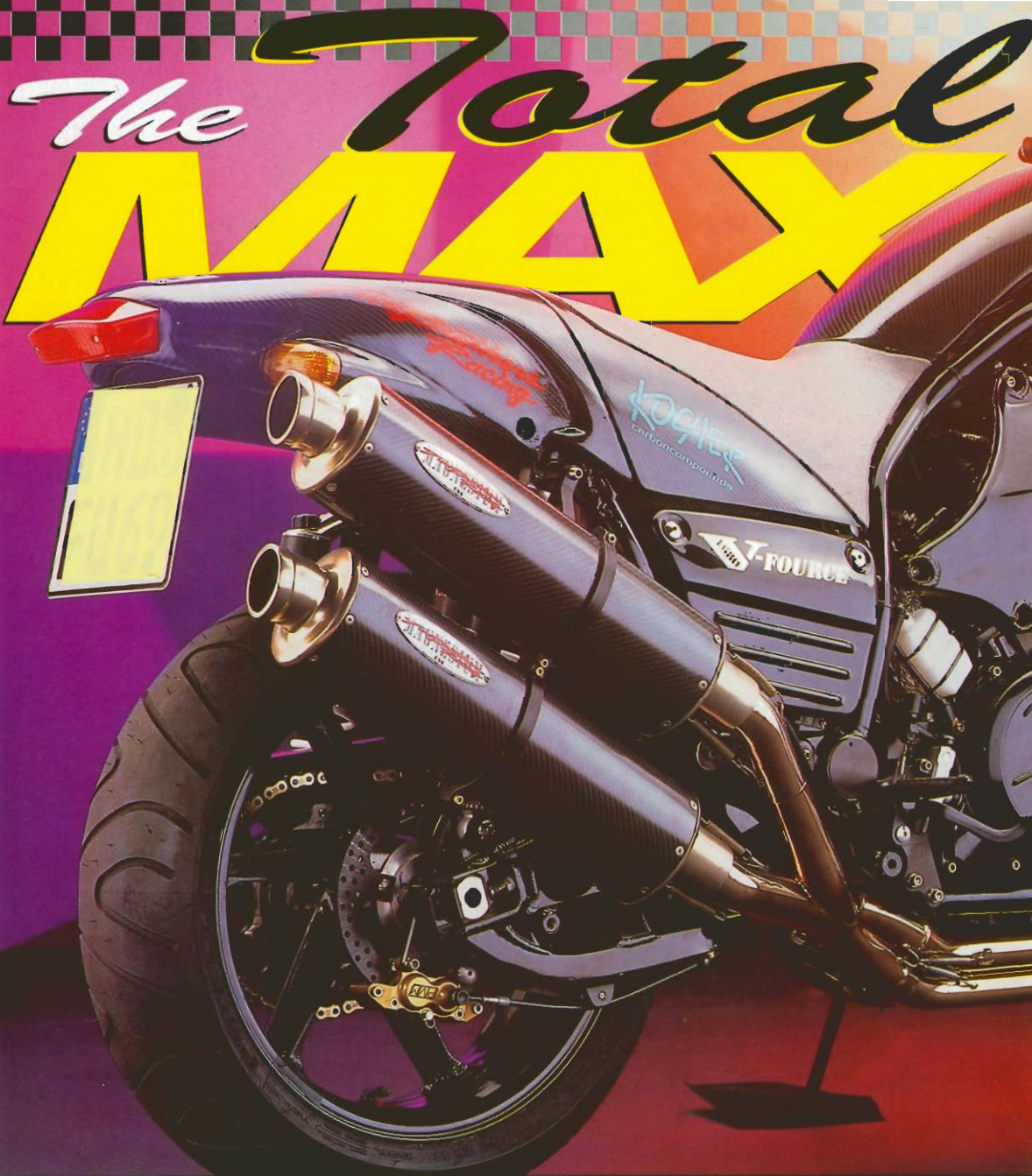
Buell S1 Lightning

VD Classic's Harley Sportster

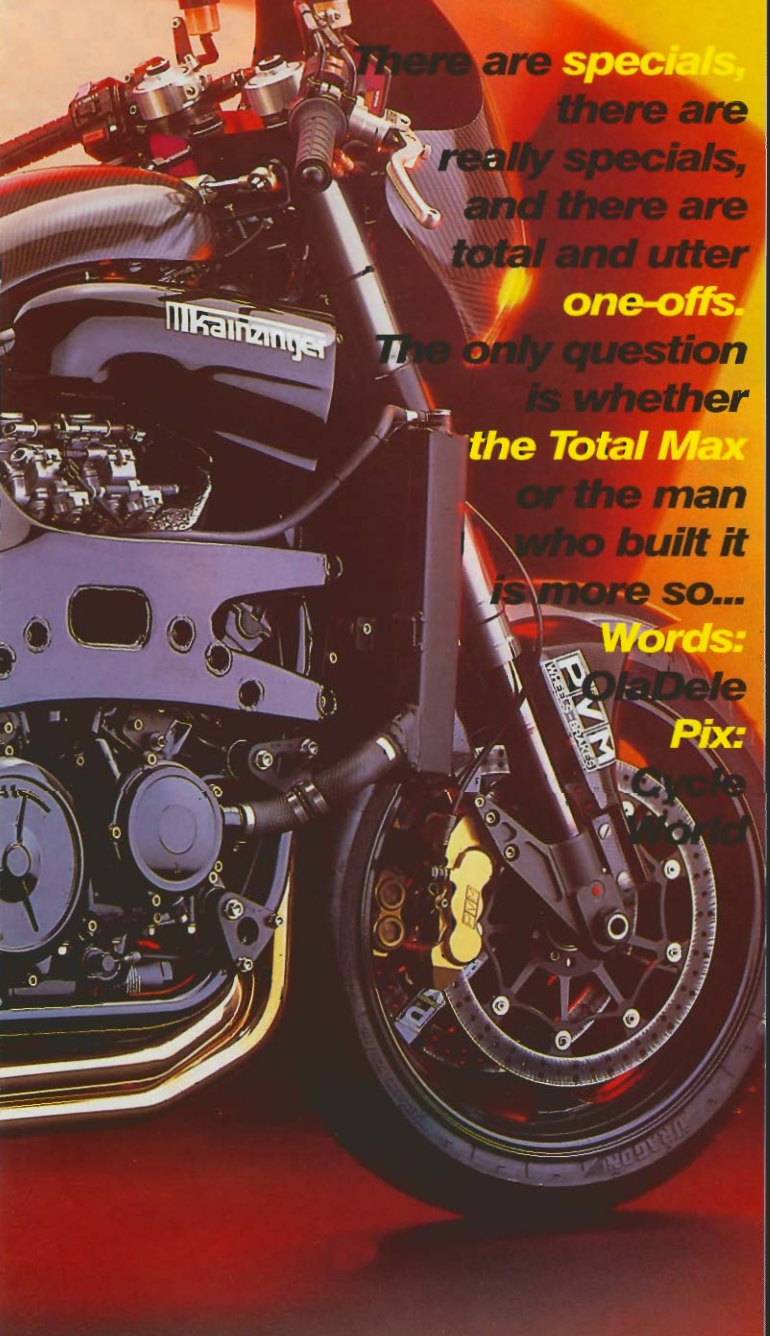
Plus MENTAL Blade

Hooligan's 916/900RR Hybrid

The Total MAX



LAST SUMMER A MATE OF MINE, WHO SHALL REMAIN NAMELESS (there you are - told you I wouldn't let on, Christian...) suffered a particularly humbling experience, out rip-speeding his ZX6R. There he was, Dainesed up to the back protector, tucked under, eyes bulging, neck straining, veins popping, leaning right off and fighting the mid bend Gs, when his GP concentration was distracted by a cheerful, greeting from over his shoulder. Risking a peek, he saw a jolly chappy on an old(ish) looking, non-descript two-wheeled something-or-other, waving as he leisurely passed him on the outside - in shorts. GUTTED! So, as legend goes, was an un-named world superbike rider, who suffered a similar humiliation whilst trying to reduce his lap times on Italy's demanding Mugello circuit, when he too was usurped by a bike which similarly defied any description apparently worth worrying about. On this occasion the rider needed only to wait until he hit the pits to front the perpetrator of the outrage, but his ego was no less crushed



There are specials, there are really specials, and there are total and utter one-offs. The only question is whether the Total Max or the man who built it is more so...

Words: OlaDele

Pix: Cycle World

than my mate, when he discovered that said upstart was not piloting a prototype supersports rocket, but a muscle bound Yamaha V-Max.

The quantity of exotic non-functional paraphernalia currently available for the V-Max verges on the realms of Harley-esque opulence with a range of goodies as varied as for any Fatbob. So, when a more than half-decent engineer takes it upon himself to do a half decent job with what is already a more than half-decent motor, engineers at the cutting edge of race technology have good reasons to question their once exclusive club. The Max which took the superbike rider (now considering a career change) on the inside with its front wheel pawing the air, was no ordinary 1200, sharing few characteristics with the doner bike. Almost every key component of the motor had been substituted by parts of comparable quality to World Superbike spec goodies, turning a once musclebound prizefighter into kick ass, jab and hook K.O.

This is the brain, not to mention blood-sweat-and-tears child of one Herbert Kainzinger, spannerman extraordinaire, and a guy who originally worked on four-strokes, but decided he wanted to test his abilities further and so ventured into the world of two-stroke racing, competing in the German 250, 350 and 500 championships and recording several rostrum finishes, interspersed with not a few DNFs (does not fly) the latter of which proved fatal to his championship winning aspirations.

In between visits to the rostrum and the first aid tent, Herbert was persuaded to prepare the engines of other German front row riders who'd clocked on to the reliability and speed of his mounts. This soon flourished into a career that saw a 2nd place in the 350 German National Championships with Jochen Metzger in 1984, followed by a 2nd in the European Championships with Helmut Bradl in 1988. In 1991 came an 8th overall and best privateer with Jochen Schmid in the 250 World Championships, in 1992 a first with Stefan Kurfiss in the National Championships on a 125 and a 3rd the same year, with Ralph Waldmann in the 125 World Championships.

Two years after first plying his magic on the world two-stroke road racing circuit, Herbert decided he'd met the challenge and had enough of the toil. At the same time he discovered there existed a group of incredibly liquid individuals who weren't adverse to leaking it on superbly engineered, hideously quick sports bikes, and so prompted by this he chucked in his lot at the races and returned to four-strokes.

In 1993, Herbert chose a ZZR1100 to become the first bike to receive the Kainzinger treatment, not only reducing Zed lead to 206kgs wet, but prising 169 bhp from the rear wheel, whilst all the time retaining the standard engine volume. Further, in '95, Herbert radically modified a FireBlade, reducing the wet weight to less than 200kgs and extracting an incredible 154bhp at the back rubber, again without increasing capacity. Not surprisingly both bikes received rapturous acclaim from the German press.

Still this wasn't challenging enough. For Herbert, both of these bikes were basically good sports motorcycles to begin with, so after a reluctant birth into the world of the V-Max, initiated by a friend who kept badgering him to make his go faster, Herbert

decided to explore the potential of building a unique machine based on the engine of a crashed Max. Surely then, the challenge would be big enough?

The Machine

Modern sports bikes are so accomplished now, possible gains in power are relatively small and hard to realise. The V-Max, on the other hand, is possessed of an engine that has remained all but unchanged since its introduction at the beginning of the '90s, meaning that there's a lot more scope for improvement, making extra power easier to find - relatively speaking. Just replacing the carbs with flat sliders and sticking on a decent exhaust system generates tremendous amounts of torque. But any fool can do that. So Herbert decided to try the impossible instead - improve the handling.

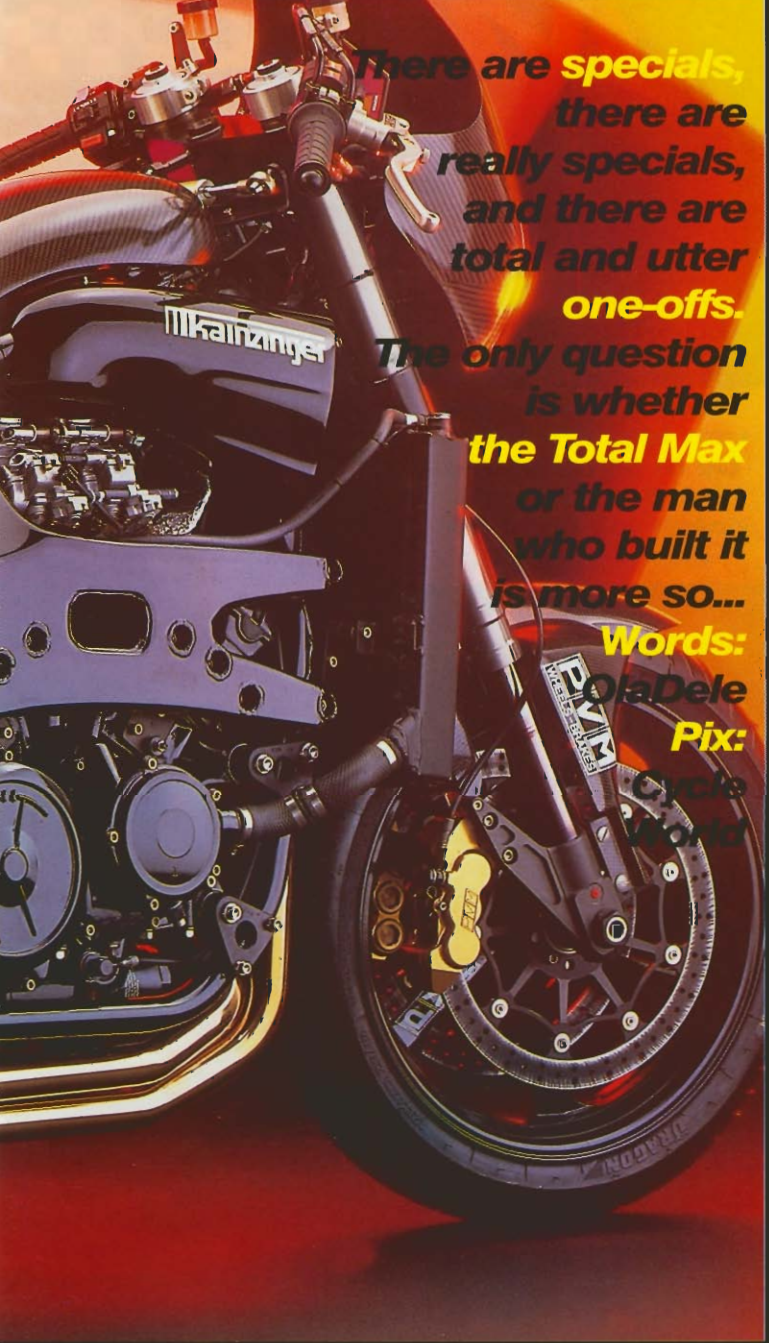
First off, Herbert altered the existing steering head to 24 degrees, with exchangeable inserts to vary it from 23-25 degrees, a la GP style. Into the newly angled yokes he slipped extra long WP forks bearing a 17 inch front wheel, all of which also reduced trail to 3.7 inches - comparable to the best factory sports bikes. Not content with mere adjustment, he next replaced the entire frame for something both smaller and lighter, but at the same time more rigid. This was married to an aluminium swing arm of a design based on the rear forks of the most contemporary GP machines and two inches shorter than the Max's original one, enabling the conversion of the shaft to chain drive more easily. Overall the wheelbase was shortened to 1430mm (160mm less than stock) and the weight distribution changed to a 51:49 bias towards the front - again like a superbike.

Kainzinger believes the biggest performance improvements on a bike are made by reducing weight and friction. With this in mind, he replaced nearly every fastener with a titanium or aluminium equivalent, changed the under-seat petrol tank, seat pan, and airbox-cum-carb cover to cabonfibre, lightened the alternator and trimmed down the crankcases. Further savings were made by removing all the rubber bushes from the engine mounts, and shaping large aluminium cross sections to bolt the engine rigidly to the frame.

Turning to the engine, Herbert first bored it out to a massive 1680cc, replacing the pistons with Cosworth 90mm items from Aptec. He then installed titanium rods and wet ally ceramic liners, also from Aptec. The crankshaft was lightened and balanced, the cylinder heads modified with beryllium copper valve seats, and the inlet and outlet valves changed to 32.5mm and 27mm respectively on 5.00mm stems. Shims were secured beneath the bucket valve train by hard faced buckets and coated titanium valve spring retainers. Hard weld cams were fitted, undercut transmission was installed complete with electronic quickshift, as was a Kainzinger patent clutch kit and a super light fly wheel. Add to this Keihin FCR 41mm carbs with accelerator pumps, a carbon ram-air system airbox, a bigger radiator and totally modified cooling system; specially built White power, WCC coated USD forks and a bespoke White Power fully adjustable rear damper unit; front and rear PVM racing 6-spoke 3.75/17 inch and 5.75/17 inch wheels respectively; 2 PVM 6 piston monoblock calipers with 2 320mm PVM discs and a 17mm diameter PVM radial brake cylinder at the front balanced to a single PVM 4 piston caliper with 220mm disc at the back; and a Kainsinger designed 4-1 exhaust system with 40mm tubes and twin C-3 mufflers on one side, and you suddenly realise if you didn't before, that this is no ordinary special.

...at 170mph you can blip the throttle in 5th and the front wheel will catch air from the sheer power...

The result: a bike with the geometry of a cross between a Blade and a GSXR750 weighing in at 192gs dry - less than a 996SPS. A bike that is torsionally stiffer than a '96 Kawasaki superbike, with a quality of parts comparable to those you would find on the front row of a World supers grid. A tiny bike powered by a highly tuned 1680cc big bored V-max engine, putting out a staggering 249bhp at the rear wheel and delivering more torque than the CBR1100XX Honda. A bike on which at 170mph you could blip the throttle in 5th and the front wheel would catch air from the sheer power. This is a bike that when all the engine and chassis work was completed, was still considered unfinished by its maker until the Stack St 800 tachometer with LCD showing readings for speed, coolant temperature, oil temperature etc was fitted; until the carbon bikini fairing at the front, the carbon solo fairing at the rear, the single seat/gas tank one



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piece in between, and a rich black paint job were added. This was the bike that cost £44,100 and was trashed by an Italian journalist who lost it in second on a third gear bend.

There are a couple of other V-max's around made by Herbert neither of which are as good accomplished as the 1680. He descibes them as 50% and 70% versions of the original and even though he plans to rebuild 1680, he has no plans to build another to match its power and performance.

Right now Kainzinger is working on Bimotas, a company who have recently offered him a World Superbike spannering job. His own company is the main Bimota dealer for the whole of Southern Germany, and if ever there was one manufacturer who needed a man of this level of talent, Bimota is it. So far he has created his own ram-air system for the SB6R, resulting in an additional 25bhp. He plans to modify it further using carbon fibre and titanium, just like a front row works bike. The first such machine will be ready at the end of the year, propelled by a Suzuki 1100 engine, though by the time the man has finished, little more than 30% of it will be original Bimota. Herbert's objective is 190-200 bhp at the rear wheel, a top speed of 200 mph, a wet weight of 200 kilos, and handling like a WSB contender. It will be a one-off. Just like Herbert, really.

LEFT: STACK ST 800 tachometer with LCD display for speed, coolant temp. oil temp. and everything else you can think of.
RIGHT: Shaft drive hss been shafted in favour of chain and sprocket get up.
BOTTOM LEFT: Kainzinger's own exhaust system with a couple of C-3 muffs.
BELOW: On board computer technology with the latent power to guide the entire U.S. nuclear effort.
BOTTOM RIGHT:6-spoke magnesium racing wheel, 2 mono-block 6 piston calipers and 320 discs by PVM, PVM and PVM.