



# AN EXUPTIONAL MACHINE

The FZR1000R EXUP set the blueprint for all Japanese sportsbikes that followed. It's arguably the first Japanese bike that truly handled too.

Words: Tim Cummings Photos: Paul Bryant

**M**eeet the best handling machine from the late 80s. Don't agree? In 1989 when the bike was new, most riders in the Isle of Man 1300 Production TT race opted for it and took the first eight places among them. The unbeatable combination of a torquey, powerful engine, handling that was significantly better than its rivals and excellent brakes made it the bike to beat at that year's TT races. That might sound like an obvious list of ingredients but in the 80s the Japanese were only just starting to combine those virtues and the EXUP had more of them than anything else on offer.

Now, motorcyclists are an image conscious bunch. Even the, supposedly, more mature riders who are interested in older machines. That's why good condition Suzuki GSX-R1100s make good money, while the far superior FZR1000R EXUP is

significantly cheaper on the used market. The GSX-R has an image of being a bit of an animal. It's this same effect that props up the values of other fearsome machines like the Kawasaki 750 H2 and Suzuki's RG500. However, if you want the best 1000cc sports bike from the late 80s there's no question about the machine – it's Yamaha's undervalued EXUP.

It's an interesting bike as well as a rapid bargain. Assorted pioneering technology was used in the EXUP, primarily the Exhaust Ultimate Power valve itself which, once the 10 year patent had expired, every other Japanese manufacturer has since copied.

It's got the performance, the history and it's even pretty practical. Factor in the bargain price and it's hard to find a bike which offers so much to so many for so little. ●







The original silencer has been replaced but the EXUP valve remains



## “THE BIKE AS A WHOLE WAS MORE THAN A TECHICAL TOUR DE FORCE”

### AHEAD OF THE PACK

No one says they've got an 'FZR1000'. No, the bike is commonly known as an 'EXUP'. It's the acronym for Exhaust Ultimate PowerValve and it not only became the term by which the bike is known, it's also its greatest innovation which has become commonplace on many of the latest performance four-strokes. The EXUP valve was actually first fitted to the 1987 FZR400R which wasn't officially imported to the UK until later in SP guise but it was the FZR1000R which first let UK riders utilise this clever gizmo. A patent taken out by Yamaha meant no other manufacturer could copy the design for 10 years. But once the patent expired rivals made their own similar systems – and they're still being fitted to this day.

The EXUP valve itself is fitted midway down the exhaust, in the collector between the downpipes and the silencer. At different engine revs different exhaust sizes and shapes would work best and the EXUP valve modifies the exhaust to give improved results through the rev range. It's a long, blade shaped rotary valve which is operated by an electrical servo motor controlled by a microprocessor. Yamaha claimed it improves intake efficiency, reduces fuel consumption and boosts low and midrange power without sacrificing performance at peak revs.

It works by altering the pressure in the exhaust. On a high performance multi cylinder four-stroke engine like the FZR1000R, the valves tend to open for long periods, which can overlap with each other. This means the intake mixture is greatly affected by pressure conditions around the exhaust valve. Positive or negative pressures generated at the exhaust valve have a dramatic effect on burnt gas scavenging, fresh mixture combustion and as a result, power output. Negative pressure during valve overlap gives smooth burnt gas scavenging and exhaust flow, which helps intake giving better combustion and increased power. Positive pressure, generated by exhaust gases at the exhaust valve, is gradually propagated along the inside of the exhaust pipe until it reaches the end where it's reflected back as a negative pressure wave. This wave is reflected back along the exhaust and when it reaches the end, returns as a positive wave. This causes a cycle of alternating positive and negative pressure at a certain frequency, the cycle being dependant on the waves' speed and the exhaust pipe's length. An exhaust pipe designed to work at high rpm won't be as efficient at low rpm and vice versa but the EXUP valve gets around this. It prevents

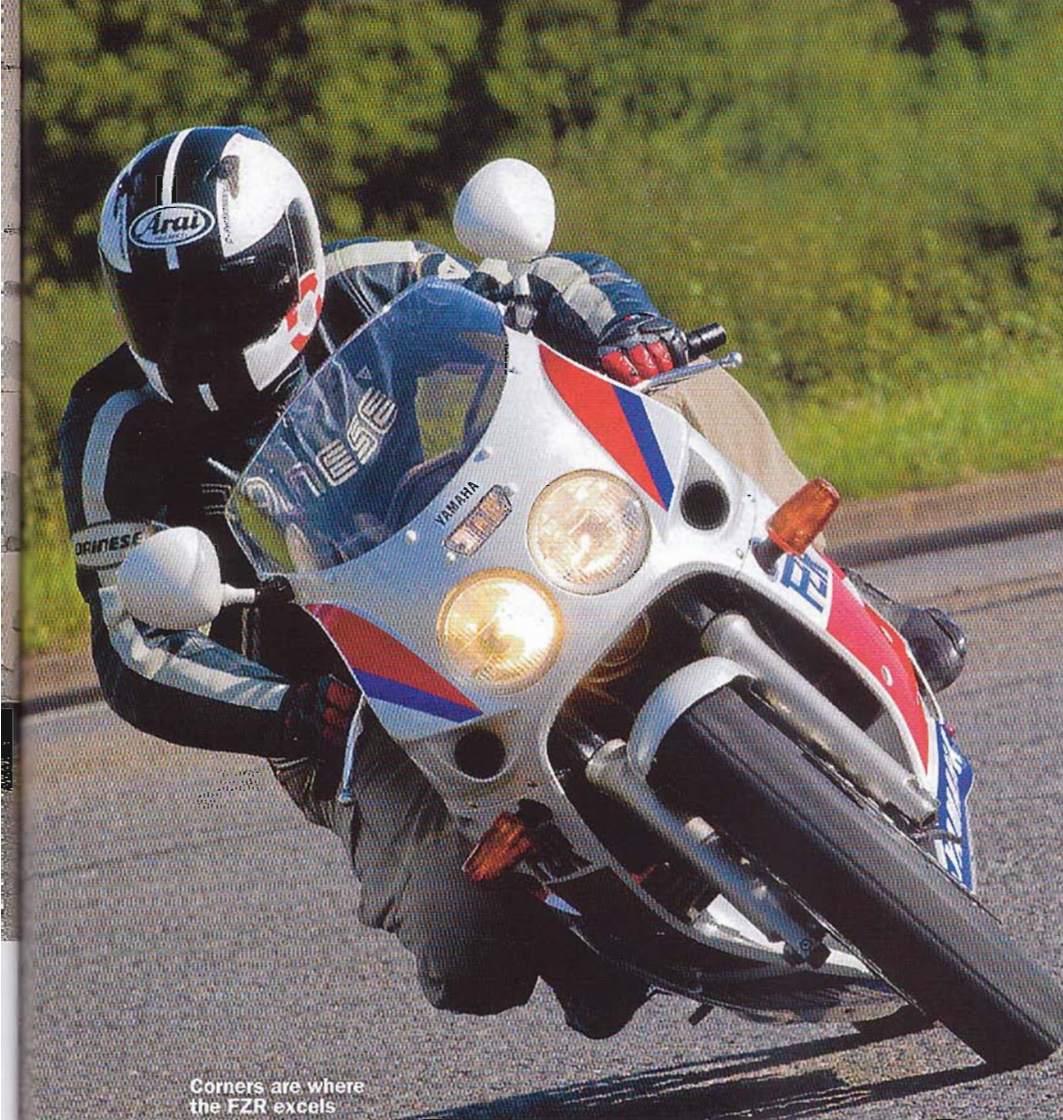


The open pipe lets the engine sing



Braided hoses improve the standard brakes





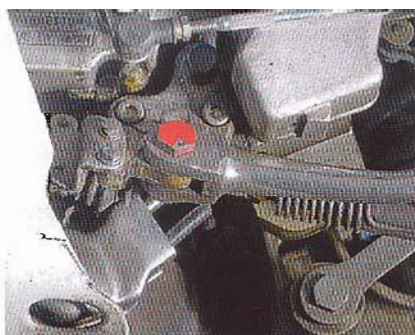
Corners are where the FZR excels

blowback resulting from positive pressure at the exhaust valves during valve overlap by controlling the generation of pressure waves inside the exhaust pipe, improving intake and exhaust efficiency.

If that's too technical stick to the original explanation; it boosts low and midrange power without sacrificing top end. Yamaha claimed improved fuel consumption and more stable, quieter idling too.


The bike as a whole was more than a technical tour de force. It was the daddy of the litre-sports class for three years. Suzuki's GSX-R1100 never handled particularly well and neither did Kawasaki's voluptuous ZX-10, Honda's CBR1000 was more tour than sport, and even the Kawasaki ZZ-R1100, released in 1990 couldn't catch the EXUP although again it was a sports tourer, not a full on sports bike. From 1989 until the smaller, lighter Honda FireBlade appeared in 1992 the EXUP was top dog.

The EXUP valve wasn't the only innovation which appeared on this model which has become the norm. Aluminium frames may have been used in production road bikes since the 1983 Suzuki RG250 but the EXUP was the first mainstream bike to have an incredibly chunky one. It was also among the first mainstream bikes with 17-inch wheels plus 120/70



The EXUP valve is under the black cover between the fairing and sidestand

front and 180/55 rear tyres which remain the performance default to this day.

The engine is fairly typical but has some interesting features. The 'Genesis' concept involves leaning the block forward to give minimum resistance for intake and exhaust gases. Using five valves per cylinder rather than four has several advantages although no one copied this and Yamaha only eventually dropped the idea themselves in 2007 (due to needing a cylinder head shape that couldn't be achieved with five valves in there). Nonetheless, the engine had few changes before being used in the later Yamaha YZF1000R Thunderace and was still recognisable in R1s up until 2006. 

## I BOUGHT ONE FOR £500



Adam Collinge told CMM: "I bought my 1992 FZR1000 RU EXUP for £537.88 from eBay, from a chap in Bridgewater. It was taxed and tested and just about everything on it worked. The only outstanding issue was that the EXUP valve had been removed as it had seized. The bike has done 43,500 miles (or maybe 143,500 miles as there is no history or old MoTs) and starts on the button first time with no smoke! I've looked at the removed EXUP valve and the bearings have collapsed which makes me think that the servo might be stripped too.

"The bodywork is all there apart from a missing piece by the screen, it all needs a respray, but at £500 running who cares! I am a paramedic and commute rain or shine on some lovely rural roads, letting the Micron can sing its delightful song after getting it beyond the obvious flat-spot above 3500rpm due to the missing EXUP.

"I've been riding for 25 years, starting with a GPz550, which I used to commute to Germany when I was in the forces. After that it was shafties for 20 years and mostly tourers. However, I was lured back to sports bikes after lusting after 900Rs and ZX10s in my youth, but this FZR was so cheap with half an hour to go, it was worth a punt – and I won it.

"You may think I'm mad buying a bike blind with no history, particularly one like this, but in 25 years I've only been left stranded twice – and that's not bad considering only one of my previous bikes has had history!

"Since buying my FZR I have discovered myriad of aftermarket suppliers to sort me out a whole load of kit, but for the time being I will just keep it on the road and enjoy the commuting."





## RIDING ONE TODAY

It's all about the midrange. The engine's a good example of a powerful 1000cc four but the EXUP works its magic giving a huge spread of tractable power which makes the bike seriously fast. The strong midrange means an EXUP engine is easy to use. At 2000rpm it's pulling smoothly and by 4000 it's quick. From there power just builds and builds to a searing summit just shy of the 11,500rpm red line – a rev limit that earlier machines just couldn't match with the same level of reliability. Unlike many more modern Yamaha's there's just enough vibration to give the power plant some personality too.

The riding position, compared to the company's outgoing FJ1200 is sportier and far more focused. The riding position's odd with feet tucked up high and quite forward and there's a long stretch to the bars. But it's comfy at 70mph+ and the big screen works well. Compared to a modern machine it's a relative sports-tourer.

In terms of handling it's quite a long, heavy machine and doesn't flick into corners easily, it's more of a gentle roll. But on the road that's a good thing as stability's generally a greater virtue than dexterity. The one thing it doesn't suffer from, unlike earlier machines, is a hinge in the middle. The bike is solid mid corner with no wallowing or bad manners. And it was a genuine peach compared to the wayward GSX-R1100 of the day.

As with all older machines, current condition has a colossal impact on how they ride. With reasonably fresh suspension, good chassis bearings and modern tyres the EXUP's a good 'un. It's one of those bikes anyone can get on and ride hard immediately, like Honda's VFR400RR and mid to late noughties GSX-R750s. Fitted with 2010 rubber, rather than 1989 Michelin Hi Sports, a scrupulously maintained



170mph and 11,500rpm – big numbers in anybody's book

EXUP should handle better now than it ever did – even when new. Tyre technology has come a long way.

The brakes were awesome when new and easily capable of overwhelming the front tyre with just two fingers on the lever. However, they're something which goes off quickly and many examples are lacking in feel and power and will need a minimum of a caliper service and new pads to get even close to their as-new performance.

The bike has some practical, pleasant touches too. The fuel reserve is operated by a neat electronic rocker switch conveniently placed near the left bar – so there's no fumbling around under your left leg trying to get reserve before the engine dies completely.

It's not all gray though as the headlights are pretty useless and the mirrors are terrible – something that afflicts many modern machines too. But if you want good mirrors, buy a Ford Transit. The EXUP's all about speed, especially gorging yourself on the plethoric midrange and exploring the stable big lean and high corner speeds which the mighty Yamaha's been doing well for over two decades.

## BUYING AND OWNING

It may have cost £6000 when it appeared but EXUPs are pretty cheap now. Strangely, they don't have a huge following which keeps prices high. Early FireBlades and GSX-R1100s have semi-cult status and are thought of as modern classics but not so with the EXUP. That's good news if you're buying. Nice examples rarely make more than £1400 and a solid bike with a few scars can be had for well under a grand. If you're lucky you might score one for around £500 which only needs a little work to make a usable, extremely rapid machine. There are the exceptions, as with all things heading for classic status, we've seen mint, low-mileage machines for £2500 or more. As more of these machines slip into the breaker's yard the price of the mint machines will only be forced up.

The early models go for less than the later RU models with their up-side down forks. The final fox-eye examples make the most money but you'll still struggle to pay more than £2000, partly as that's getting into early R1 territory. In terms of collectability we think the original right-way-up fork model is the one to go for. These always fetch more

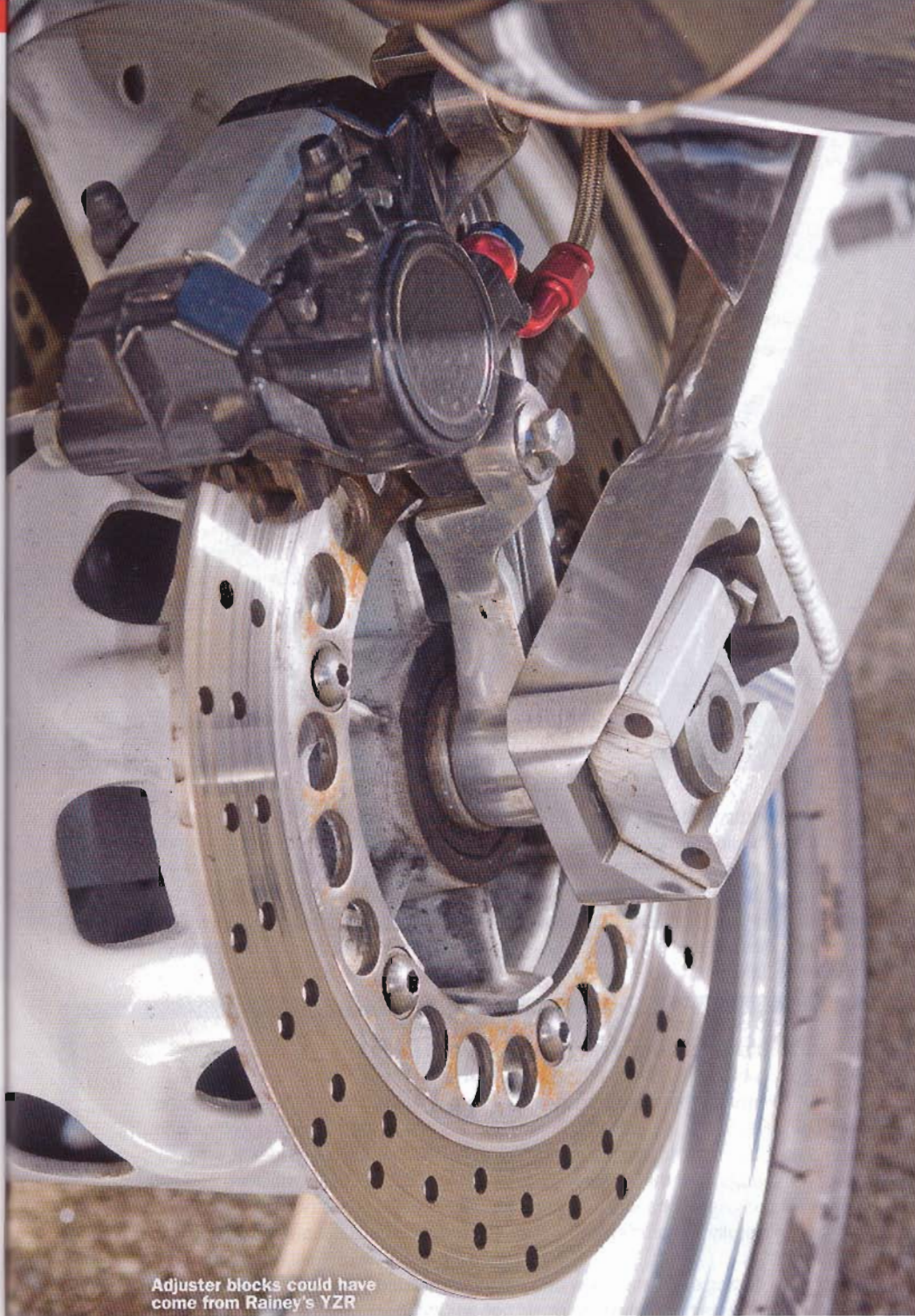


Not brutal but certainly handsome



Deltabox – central to the FZR





Adjuster blocks could have come from Rainey's YZR

in the classic speed block red and blue paint scheme – as pictured here.

Insurance is a mixed bag. Group 16 puts it in the same bracket as a modern superbike but plenty of insurers offer cheaper policies for older bikes, the holy grail of which is classic insurance. Some classic policies are sniffy about modifications so get a quote for any bike before you buy.

Getting down to the nitty gritty, clutches are a weak point. The plates can wear if you give them a hard time but the basket itself can cause problems too. If it squeaks when you pull away there's wear and if ignored, the basket can shatter which is dangerous and expensive to fix.

Most use oil. Exactly where and how isn't 100% certain but it gets burnt if you

rev the engine fairly hard. A litre every 1000 miles is not a major problem and some bikes run fine using more.

Front discs are prone to warping but there's lots of choice if you're buying used replacements. Ducati 916, 996 and 900SS ones fit as do many Aprilia discs and some others made by Brembo. For a full list of which fit and loads more priceless EXUP info go to [www.fzr1000.co.uk](http://www.fzr1000.co.uk)

Reserve switches can play up but it's usually just the contacts needing a clean. One bodge is to disconnect the sender from the tank which lets the tank go from full to dry without needing the switch.

Easily removed webs in the carb stubs restricted all but the latest bikes to 125bhp (dynos showed more like )

## I'VE OWNED 11



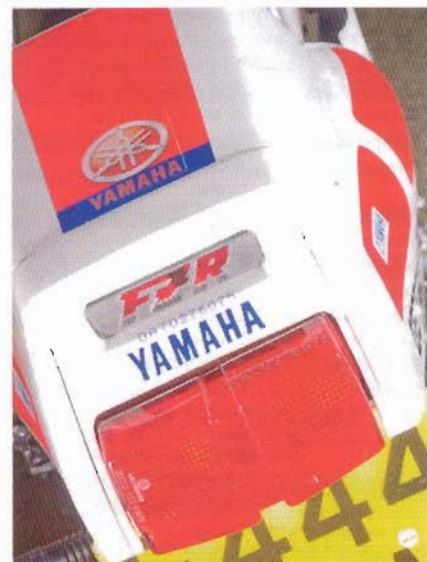
Chris Reed (or CreedEXUP as he's known on [FZR1000.co.uk](http://FZR1000.co.uk)) bought his first EXUP in 1990. He liked it so much he's owned another 10 since.

"I've got three whole ones at the moment plus some others for parts. They do everything so well. They're fast enough, handle nicely and even take a pillion. I recently bought an R1 but I prefer my old EXUPs. The R1's fast and handles amazingly but it's not as versatile. My wife doesn't find it nearly as comfy on the back seat.

"I do all my own servicing and there's nothing too difficult. There are 20 valves but that's only four more than 16 which loads of other bikes have. They're adjusted by under bucket shims so you do have to set up the cam timing after adjusting them. Yamaha say they only need doing every 26,000 miles but I'd suggest doing them every 20,000 or sooner. The intake valves do close up and if they get too bad they can start to cause damage.

"Fitting the six-speed gearbox from a YZF750 is a good mod as it's stronger, as well as having the extra ratio, but you need to strip the engine right back to do it. Shorter rear linkages lift up the back and make it feel more sporty and that's much easier to do.

"One of my bikes has a Wiseco 1070cc big bore kit. It gives a bit more top end but loads more midrange. It needs quite a bit of work to fit though; the 1040cc version's much easier as it only needs the barrels boring out and it still gives a good boost in the midrange."





## FAMILY TREE

### 1989

Original FZR1000R EXUP launched. Red/white/blue or silver colours. 3LG1 model, frame numbers of UK bikes begin 3LG-000101.

### 1990

Slight tweaks. Preload adjustment on front forks and exhaust can gets alloy finish. Red/white/blue or blue/black colours. 3LG2 model, frame numbers begin 3LG-004101.

### 1991

Significant update, new model called the FZR1000RU EXUP. Most obviously distinguished by restyled bodywork and lights, upside-down forks, and A-shaped section of the main frame extending below seat. Red/white or black. 3LG3 model, frame numbers begin 3LG-009101.

### 1992

Minor tweaks. New twin beam projector headlight and modified graphics. White/red/black, white/violet or blueish black. 3LG4 model, frame numbers begin LG6-012101.

### 1993

Revised graphics, red/white/blue or black/violet colours. 3LG5 model, frame numbers begin LG5-017101.

### 1994

Significant update. Most obvious is the new plastics with 'foxyeye' headlights and stacked rear lights to match the YZF family look. Six piston front brake calipers, adjustable levers and Ohlins branded suspension.

The ultimate late 80s superbike?



115-120) but cutting them out with a sharp knife should liberate at least 10bhp more – although most machines will have had this done by now.

There's a rose joint in the rear linkage that dries out and squeaks. It's where the linkage attaches to the shock and if it's making a noise, squirting WD-40 or similar on won't help. It needs to be dismantled and greased. If parts need replacing it's about £65. Fork chrome wears on the upside-down fork (RU) models.

Second gear can start to slip, caused by wear on the dogs, and that'll mean a big bill. Try and give it a handful in second and hopefully any problems will be obvious.

Brakes were cutting edge when new but time and the elements have taken their toll on most. An afternoon of stripping and greasing plus new pads should make a big difference. New discs, lines, fluid, Yamaha blue spot calipers which were fitted to loads of later models (some Yamaha gold spots work too) plus a Thunderace master cylinder's the hot set up and should make the bike stop better than new.

The EXUP valve can often cause problems. Wear on its bushes will make it tick or squeak as the bike idles. Worse still it can seize totally which may cause the servo motor to strip its cogs or break the cables. The bike should go into a safe mode in which it won't rev above 4000 revs if the valve seizes but some owners open it fully and disconnect the cables which works OK but loses a good amount of the midrange.

Plastics on the 1989/90 bikes are pretty fragile and later ones aren't much better; spill brake fluid on them and they'll end up cracking.

That might sound like a lot of problems and yes, a GSX-R1100 may prove more reliable in the long run but overall the EXUP's a tough bike as the number still in use proves.

## CONCLUSION

Spotting future classics is a tricky game but we think the EXUP could well be one, especially the original model. It was top dog in its day, a quality machine and still capable of giving pretty much anything on the road a bloody nose with the right rider. When it was launched one magazine said: "for half the price of an OW01, it's twice the bike on the road". We can't guarantee prices will rise but as they're so cheap to begin with you're unlikely to lose money on a tidy EXUP. ☺

## THANKS

Charnwood Classic Restorations. 01509 508905. An extremely helpful old school bike shop who lent us their EXUP to ride and photograph. It's an excellent 19,000 mile F-reg in the right colours and they're asking £1725.

[www.fzr1000.co.uk](http://www.fzr1000.co.uk) a superb resource for anyone considering owning an EXUP

Chris Reed (or CreedEXUP as he's known in cyberspace) for letting us ride his fully rebuilt RU. It's in superb mechanical fettle, pretty good cosmetically and up for £1300. Go to [fzr1000.co.uk](http://fzr1000.co.uk) if you're interested.

## SPECIFICATION

### YAMAHA FZR1000 EXUP

Price now	£500-£2500
Engine	1002cc, liquid cooled, 4-stroke, inline four
Bore x stroke	75.5 x 56.0mm
Fuelling	4x Mikuni BDST38
Compression ratio	12:1
Power	145bhp @ 10,000rpm (crank)
Torque	79lb-ft @ 8500rpm
Ignition	CDI
Wheelbase	1460mm
Seat height	765mm
Fuel capacity	19 litres (4.2 gallons)
Gearbox	5 speed
Final drive	Chain 532ZLV
Brakes	Front – twin 320mm discs, 4-piston calipers. Rear – 267mm disc, single piston caliper
Tyres	130/60-17, 170/60-17 (changed in 1990)
Dry weight	208kg
Top speed	165mph