

3 Spanish Rotax winner—*Kobas 250*

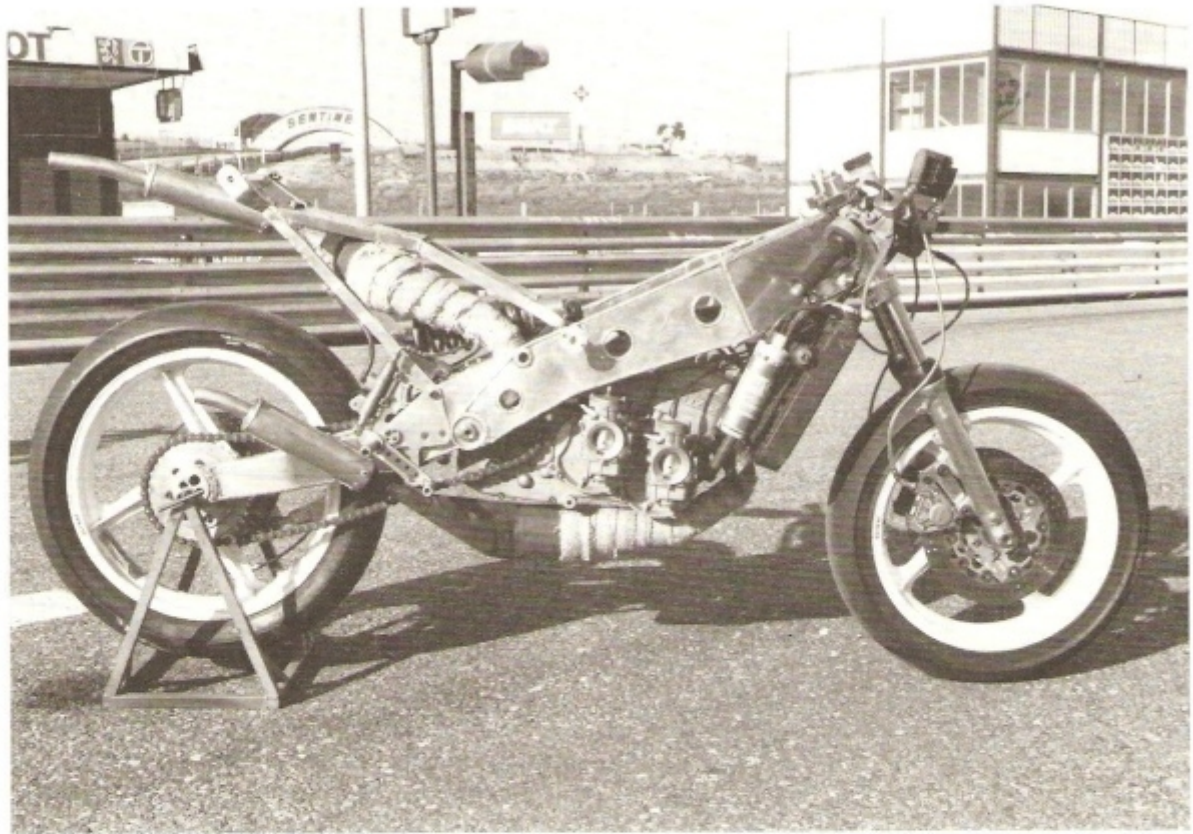


Carlos Cardus en route to the 1983 European 250 cc title on the Spanish-built Kobas-Rotax (Author)

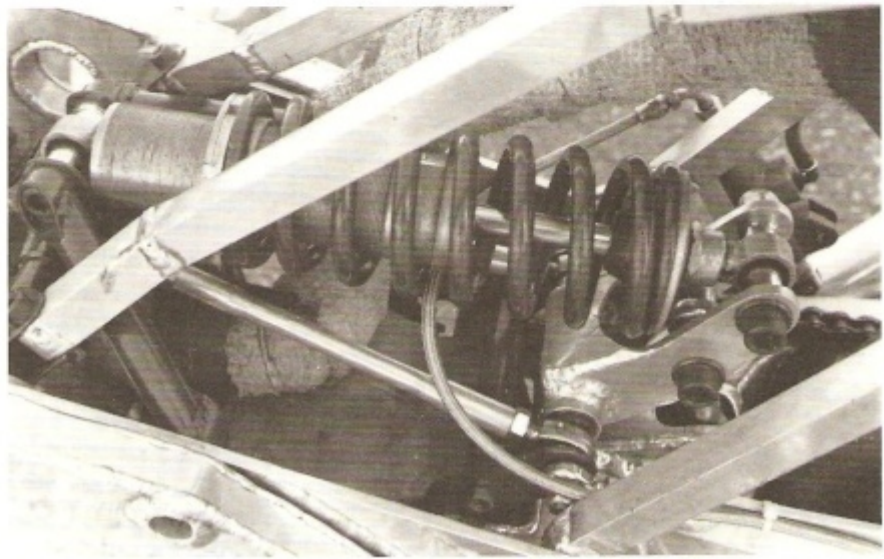
Since the Austrian tandem-twin Rotax engine first appeared in Grand Prix racing in 1980, it's fair to say that until 1983 it flattered to deceive. Touted as Europe's answer to Japanese domination of the 250 class, the engine certainly enabled many small chassis manufacturers to realise all-European bikes, but without really permitting them to get on terms with the oriental machines, nor with the factory specials such as the MBA and Pernod.

But 1983 was the year that the Rotax finally began to fulfil its promise. Three years of intensive development had eradicated initial design faults that in races resulted in either loss of performance or retirement, and thanks to the careful attention to detail that characterises Teutonic engineering, the engine was now reliable enough to win a Grand Prix. Which is exactly what it finally did in—aptly enough—Austria in May '83, in the hands of German Manfred Herweh whose Spondon-framed Real convincingly defeated the cream of international competition on the Salzburgring. Two weeks later Irishman Con Law won the gruelling Isle of Man TT on the Ehrlich EMC, whose Rotax engine took him round the 37.75 miles course at over 110 mph for the first time ever in the 250 class. And to cap a heartening season for users of the Austrian firm's engines, Spaniard Carlos Cardus was a clear and convincing winner of the European 250 Championship on his Rotax-powered Kobas.

In many ways, Cardus' success was the most



Above Stripped of its bodywork, the Kobas' unusual but effective chassis design can be seen to advantage (Author)



Right Trademark Kobas rear suspension gives full rising rate and offers compact installation, at the expense of raising the centre of gravity (Author)

praiseworthy of all, for though sponsored by Barcelona dealer and enthusiast Jacinto Moriana (also known as 'J.J.', and a successful endurance racer in his own right), Carlos did not have the luxury of two identical bikes nor anything like the same sort of budget as his well-heeled German rivals. Yet in spite of the vast distances which the FIM's curious calendar required him to travel, as far afield as Imatra in Finland and Brno in Czechoslovakia, Cardus dazzled on-lookers with a year-long display of fast and aggressive riding which literally meant that when he stayed on the bike, he won. Victories at his home round in Jarama, then at Salzburg, Paul Ricard, and Brno gave him an unassailable lead in the series, which he clinched one round from the end by a steady 6th place at Assen after all but writing both himself and the bike off when he fell in practice.

Having already tested Dr Joe Ehrlich's EMC-Rotax, I was particularly glad to have the opportunity to try out Cardus's JJ Kobas-Rotax especially since from the first time I saw the distinctive U-framed Spanish bike in the Dutch GP paddock in 1982 I've been impressed by its design and performance: So it was with some degree of pleasurable anticipation that I awaited Carlos and the team's faithful mechanic Gines Guirado on a beautiful crisp and sunny January morning at Jarama, with the nearby peaks of the Sierra Guadarrama capped with freshly-fallen snow providing a picturesque backdrop for a test of the bike which dominated the 1983 European Championship, and in doing so provided the Rotax engine with its first major international title.

Designer of the bike is 31-year-old Antonio Cobas: 'Why call the bike a Kobas, with a K?' I once asked him. Turns out the guy who designed the tank badge thought it looked better as Kobas rather than Cobas, so it was so: honest! After working for a racing car manufacturer while still at engineering college, and after, Cobas eventually returned to his first love of

motorcycles, first as a technical writer for one of Spain's motorcycle magazines, then as a designer and constructor in his own right. His first commercial design was the spaceframe Siroko, of which no less than 54 were made mostly for 250 cc racing and fitted with either Yamaha or Rotax engines. After leaving Siroko he freelanced for a while, designing the unique and successful Tecfar-Ducati with which Carlos Cardus first made his name by defeating the might of the Japanese multis in the Spanish F1 championship in 1982, then built the short run of Kobas GP bikes totalling eight in all (seven with Rotax engines, one with a Yamaha) with one of which Sito Pons entered the GP scene in 1982. Debuting at the French GP at Nogaro that year, the Kobas almost had a fairytale start when Pons lay 2nd at half-distance before crashing out of contention; he did exactly the same in his home GP a week later, again while in 2nd place. So it was not till Cobas was united with Carlos Cardus under the JJ banner that the bike really began to shine, and European and Spanish title crowns in 1983 were the just reward.

One look at the Kobas, and you know it's something out of the ordinary, with its bluff-fronted fairing, semi-monocoque alloy U-frame and far forward riding position, almost like one of the current F1 racing cars. But in a way even more remarkable was the reliability record of the team's Rotax engines during the 1983 season: they covered a total of 12,800 km in testing, practice and races without a single mechanical breakdown, in spite of being taken to 13,500 rpm as a matter of course when Rotax themselves advise a 13,000 red line. Surely, I asked Antonio Cobas when I went to see him in Barcelona a couple of days after the test, they must have made some pretty major internal engine modifications, even perhaps as drastic as Dr Joe Ehrlich had made to the EMC, in order to achieve this remarkable record? 'Not a bit of it,' was Antonio's reply. 'The engines are basically completely standard Rotax units: it takes us only two days' work



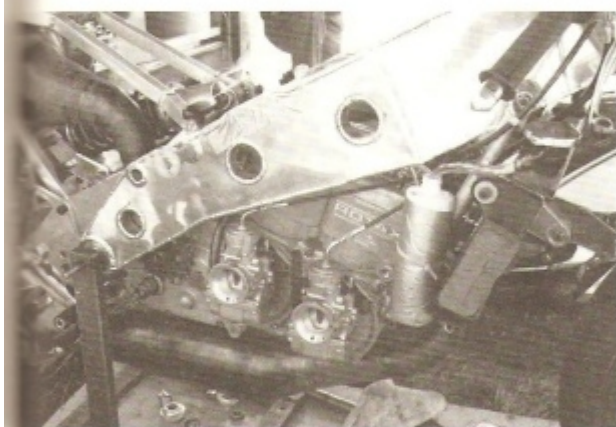
Left The extreme forward weight bias can be seen to advantage here, as the author cranks round one of Jarama's several tight left-handers on the JJ-sponsored Kobas 250 (Herrero)

Right, above and below The Kobas U-frame design proved a landmark in GP motorcycle chassis design: the following season both Yamaha and Gallina-Suzuki produced very similar machines for the 500 class (Author)

to modify them to our specification, which mostly centres around our own design of combustion chamber, and cleaning everything up. Since they modified the standard primary gears, the only weak point is the clutch, and you must just be careful using it. The secret of our reliability, if there is one, lies in taking meticulous care of the engines, replacing components well before their life is ended and building the engines up very carefully.' But hang on—when I rode the bike I was amazed at the tractability and smooth, wide power band, especially compared to the all-or-nothing characteristics of the EMC, which lit up like a rocket ship at 10,000 rpm and petered out at 13,000. On the Kobas, there was usable power from as low down as 8000 rpm, with good, strong pulling horsepower from 9000 up, with the engine seemingly happy to go on churning it out up to the 13,500 redline—there was no falling off in torque or any increase in vibration above the factory's 13,000 limit, and in fact the Kobas-modified engine even wanted to run on above the team's own redline. A 4500 rpm powerband for a modern, disc-valve 250 is incredible, and

a lot better than the standard Rotax unit: how did they do it? Antonio smiled: 'It's basically all in the exhaust pipes,' he replied. 'The suppleness comes from that, which considering we only have occasional access to a testbed is something I'm quite proud of. I'm glad you liked it!'

If I've seemed to concentrate rather unexpectedly on the bike's engine performance, when after all it's the unusual chassis design which aroused most attention, it's simply because a lot of other Rotax users could take a lesson from the JJ team's approach to engine development and maintenance. But there's no getting away from the fact that the Kobas chassis is the real show-stopper: termed a 'semi-monocoque' by the GP cognoscenti, because although the large U-shaped alloy structure weighing only 3.5 kg which took ten days to make appears to be a modern version of the Ossa or John Player Norton monocoque chassis, in fact the fuel is carried not within the frame structure but in a separate tank perched on top. Why didn't he design a monocoque, given that it couldn't have been much more time-consuming or costly to



build, I asked Antonio, and what were his aims in the design in the first place?

'Monocoques are all very well,' he replied, 'but if you want them to hold fuel then they become not only bulky, but wide—look at the 500 GP Kawasaki for example. Fitting an engine as inherently slim as the Rotax into a chassis like that would have meant throwing away some of its main advantages in terms of making the bike wider than it need be, but that wasn't the real reason I didn't build one. A wide structure is also a flimsy one, and I was concerned to build a chassis that was as stiff and rigid as I could possibly get, while at the same time being as light as poss-

ible. The U-frame was the result—once you add the three bracing holes on each side it becomes incredibly stiff, and the layout also permitted me to concentrate as much of the bike's mass as possible close to the centre of gravity, to reduce the polar moment of inertia and make for more stable handling. That's one reason for my rear suspension design—it offers a true rising rate and variable flexibility, while getting the suspension unit close in to the centre of the bike.'

Yes, but the weight distribution is another matter: when most other designers are striving to achieve 50/50 weight distribution, Cobas has gone out on a limb to make a bike that obviously concentrates a larger proportion of the sprung weight on the front wheel: how much, and why? 'I don't believe that 50/50 weight distribution is ideal: that varies from bike to bike, depending on the tyres you can use and the suspension geometry, but on the Kobas it's 51/49 frontwards without the rider, and with someone of Carlos' weight aboard it's 55/45.' In other words the riding position is calculated in such a way as to throw the rider's weight on to the bars even more than on other bikes? 'Correct, because in my opinion the single most important thing about a bike's handling is how it enters a corner: that determines everything else—cornering speed, acceleration, even top end performance. In turn that means that it's vital to keep the front wheel glued to the ground and permit as high an entry speed as possible, so by opting for a forward weight bias I'm forcing the front wheel on to the track and discouraging it from breaking away, under braking or acceleration. And being able to fit a 16 in. front wheel—we were one of the first teams to do so—gives us a wider contact patch as well as lighter steering. The 1984 bike I'm designing right now will have a 55/45 weight bias without the rider—I expect about 57/43 with Carlos sitting on it.'

That new bike would also be a spaceframe, like the Siroko, because though light and rigid the Kobas chassis and its fittings were also easily

bikes paw the air with their front wheels, the Kobas front end just got slightly light even accelerating as hard as I could while still leaned slightly over, and the steering damper took care of any waggles before they happened. Nice.

Really the only problems I encountered with the handling were on downhill, fast sweepers, of which there are two at Jarama. The shake I got on the right hander entering the main straight was simply caused by riding over the bumpy piece of road jutting out into the track: taking a wider line and cranking over further cured that. But on the even faster left-hander sweeping down to the Bugatti Esses, I felt the front wheel pattering when cranked hard over on the limit in fourth gear; short-shifting and taking it one gear higher didn't cure the problem. Asking Carlos about it afterwards, he confirmed he was getting the same symptoms, but not as badly as me because the bike's suspension was set up for his weight: he thought it was a problem with the front suspension, rather than the tyre. But coming out of the Bugatti, exiting sharply uphill, the Kobas would get a lovely early drive on with the back wheel just starting to spin under hard acceleration—very controllable and actually quite satisfying!

Compared with other Rotax-engined bikes I've ridden, the Kobas' engine was a revelation—smooth, supple and easy to ride with that delightful flat, off-beat exhaust note that characterises the 360 degrees tandem-twin. Perfectly geared at the top end for Jarama, my only desire would have been for a slightly higher bottom gear: a low Calafat first gear was fitted, which meant screaming the engine through the tight Le Mans complex when using less revs would have made taking the corners more comfortable and ultimately faster. The Rotax 6-speed gearbox has a choice of alternative ratios for first, second and top gears.

I can pay Antonio Cobas no higher compliment than to say that if I had personally decided to go 250 racing in 1984, I'd have chosen one

of his U-frame bikes fitted with his version of the Rotax engine: I'd also probably have wanted him and Gines to look after it for me! The bike was streets easier to ride than the EMC, and though by the end of my 20 laps my shoulders were aching from the pressure of the forward weight distribution, I didn't at all notice it on the bike while I was riding it, and probably wouldn't once I got fit enough for GP racing: my excuse is that January is off-season for road racers! But the combination of that late-breaking, easy-steering, light, slim chassis and the torquey, smooth engine helps explain how Carlos Cardus brought Spain her first European Championship in 1983 on the bike I rode at Jarama: if he'd only restrained his natural exuberance and stayed upright more often, he'd probably have won even more races than he did!

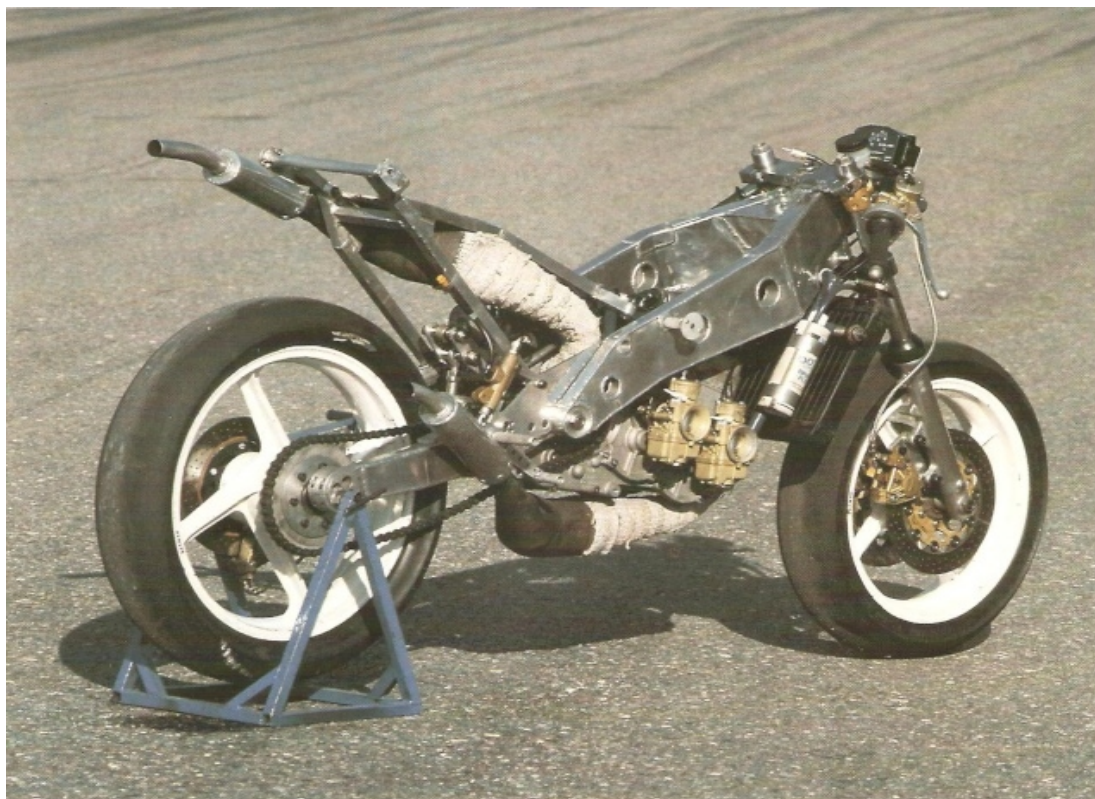
| Model | Kobas 250 |
|---------------------|--|
| Engine | Twin-cylinder disc-valve 2-stroke |
| Bore × stroke | 54 × 54 mm |
| Capacity | 247 cc |
| Power output | 72 bhp at 13,200 rpm |
| Compression ratio | Not known |
| Carburation | 2 × 37.5 mm Dell'Orto |
| Ignition | Motoplatt |
| Clutch | 14-plate air-cooled dry |
| Gearbox | 6-speed |
| Frame | U-frame alloy construction, semi-monocoque |
| Suspension: | |
| front | 35 mm Yamaha |
| rear | Monoshock swing arm with De Carbon unit |
| Brakes: | |
| front | 2 × 240 mm Brembo floating discs |
| rear | 1 × 220 mm Brembo fixed disc |
| Tyres: | |
| front | 12/16 × 16 |
| rear | 14/68 × 18 |
| Weight | 213 lb with oil/water, no fuel |
| Top speed | 152 mph |
| Year of manufacture | 1982/83 |
| Owner | Jacinto Moriana, Barcelona, Spain |



Distinctive livery of sponsor Jacirto Moriana adorns Kobas-Rotax.



Kobas employs production tandem-twin Rotax rotary-valve engine in seminal twin-spar alloy frame.

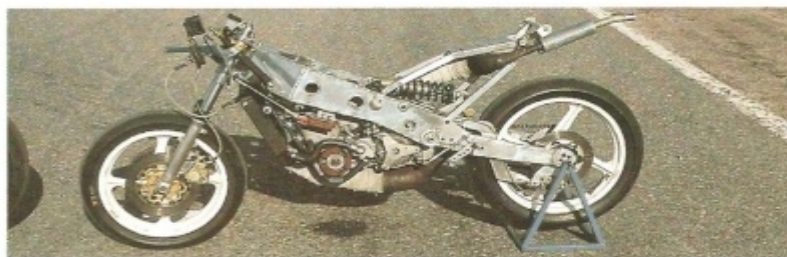


Rotax engine configuration lends itself ideally to twin-spar design.

garde ideas about chassis and steering geometry, which were also to become conventional wisdom by the end of the '80s. These included positioning the rider so as to throw much of his body weight on to the front wheel in order to improve front-end grip entering a turn, resulting in a 55/45 per cent forward weight bias where other designers of the day were aiming at a supposedly more ideal 50/50 distribution. Cobas also compacted the bike's mass and juxtaposed the centre of mass and centre of gravity to reduce the polar moment and improve handling; he actually raised the centre of gravity to increase weight transference for improved braking and extra traction exiting a turn, and increased rear suspension and rear wheel travel, at the same time controlling these by means of a rising rate linkage carefully calculated to give maximum progression. All these features later became commonplace on GP race bikes, but it was Cobas in the Kobas who first pointed the way. A milestone in modern GP motorcycle design.



Antonio Cobas.



The revolutionary Kobas chassis launched Pons, Cardus and Garriga to GP fame.

KOBAS-ROTAX 250

Engine: Water-cooled rotary-valve tandem-twin two-stroke

Dimensions: 54x54.5mm

Capacity: 249cc

Output: 72bhp at 13,200rpm

Carburation: 2x37.5mm Dell'Orto

Ignition: Motolpat CDI

Gearbox: 6-speed non-extractable with gear primary

Clutch: Multiplate dry

Chassis: Aluminium twin-spar

Suspension:
Front: 35mm Yamaha telescopic forks
Rear: Fabricated aluminium swingarm with White Power monoshock unit

Brakes:
Front: 2x240mm Brembo iron discs with two-piston Brembo calipers
Rear: 1x220mm Brembo steel disc with two-piston Brembo caliper

Weight: 97kg

Top speed: 152mph

Year of construction: 1983

