cycle guide

FEBRUARY 1979 $1.00
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Yamaha 1100 Special: Fly low, go fast, look good

NEW HARDWARE: Honda's Star-Spangled CB650, Yamaha's Woodswise IT175, Honda's CB125 Bookbagger and JD Engineering's "Works" YZ400E

cycle guide

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ON THE COVER:
Yamaha's YZ400F demonstrating its 20-percent increase in power for Richard George's Nikon.

QUOTE:
"The Yamaha YZ400F is so close to the best that only the best will know the difference." —**Page 37**

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Yamaha YZ400F

So close to the best that only the best will ever know the difference.

PHOTOGRAPHY: RICHARD GEORGE

BY PAUL DEAN

We all know that looks can be deceiving, but a motorcycle's appearance can often tell outright, bold-faced lies. And presented here as bright yellow evidence to that effect is Yamaha's new YZ400F, a textbook example of how wrong it can be to judge performance by the thin veneer of outward appearance.

It would be easy, perhaps even logical, to give this big-bore monoshocker a fast once-over and hence proclaim it a clone, a quick-and-dirty rewrite of last year's YZ400E, weakly disguised in FIM-legal number plates. But nothing could be further from the truth. Because although the basic design and styling concepts are the same, every single dimension, every specification of any importance whatsoever on the new 400 is different from those on the old. What emerges from this exercise in technical irony is a motorcycle that, despite looking old, is truly new. What's more, it easily is the finest Open-Class production motocrosser ever to wear the Yamaha name.

Previous YZ400s have been legitimate, respectable competition machines, but it's no secret that they've never quite made it into the same league with the best Eurocrossers—namely, the Maicos and the Husqvarnas. The YZ's designers had not yet hit upon that just-right combination, that perfect mix of power, suspension, steering and overall handling.

Last year's YZ400E, for example, was immensely powerful and hinting of potential greatness. But the engine was unforgivably explosive, the steering was on the slow side of mediocre and the whole motorcycle was on the sinful side of heavy. On the track it ran not unlike an overgrown, overweight 125, requiring rapid-fire upshifts to keep the engine buzzing. And making that Yamaha turn easily meant seeking out high, solid berms to use for bank shots—assuredly *not* the accepted formula for success in Open-Class motocross.

It should come as no surprise, then, to learn that the YZ400F has a much-improved, lower-rpm power delivery compared to its immediate predecessors. What *is* unexpected news, though, is that Yamaha's engineers didn't merely overhaul the powerband, they redesigned the entire powerplant. The 400 engine is now much smaller and lighter, as well as being

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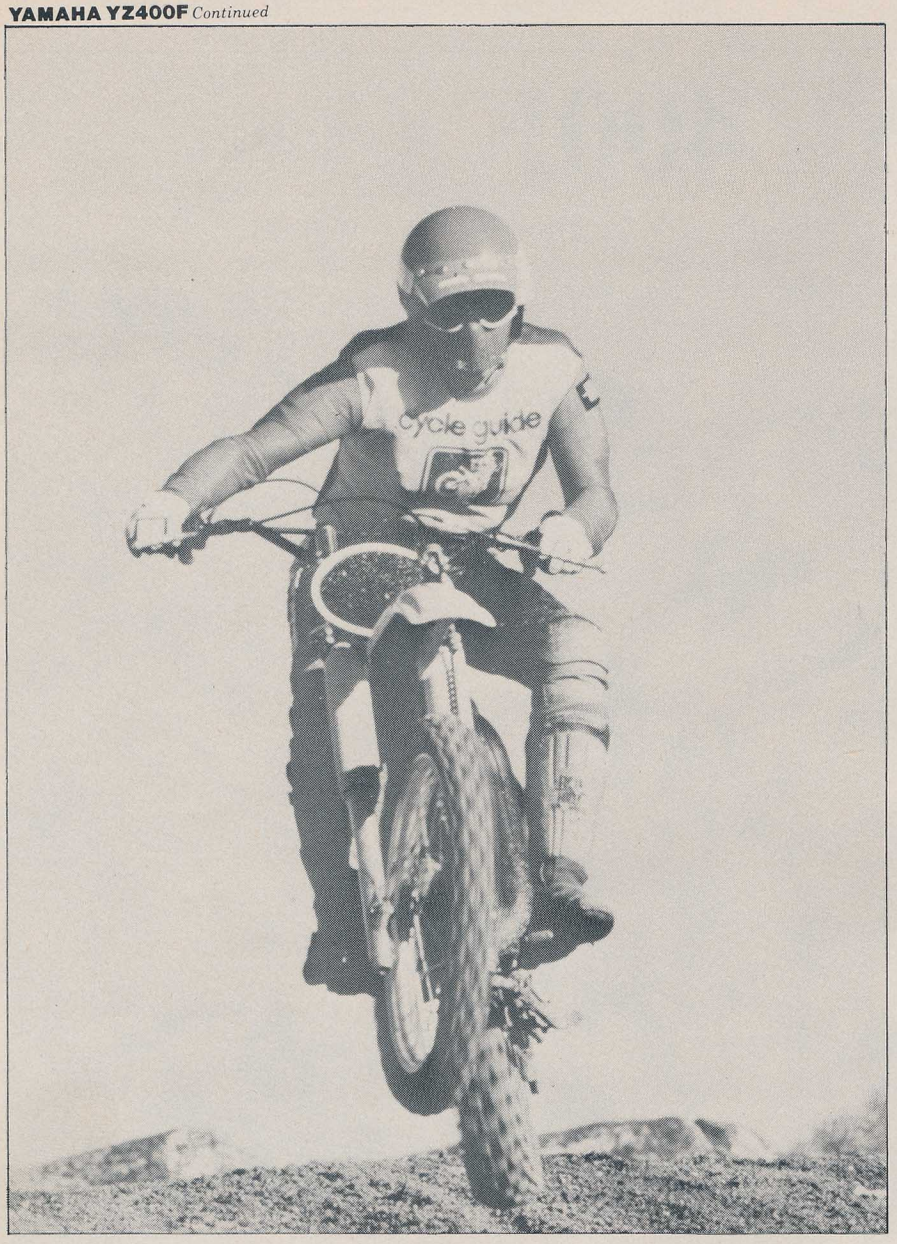

friendlier and more power-efficient. The engine has shrunk in exterior size so much, in fact, that its main engine cases are now virtually identical to those on the YZ250F motocrosser.

Finding more midrange torque without seriously compromising peak horsepower is never easy, but Yamaha seems to have pulled it off without a hitch. YZ400 owners can now brag about their bike having torque that even those illustrious European bikes would drool over. Yet the F is still remarkably fast while churning out those huge chunks of wonderfully tractable horsepower.

This newfound engine effectiveness is not there by accident. Pop the YZ400F's tiny crankcases open and you'll discover a heavier, larger-diameter crankshaft that resulted from having the stroke lengthened from 70 to 75mm. Aside from a natural increase in flywheel inertia that greatly improves tractability, another benefit of a longer stroke is that without any attendant changes whatsoever in port timing, each and every port window becomes taller. Taller means bigger, and bigger means a larger fuel charge will be burned at any given rpm. Consequently, there will be a greater power potential at a lower rpm. And low-rpm power is decidedly easier to put onto the ground than high-rpm power.

Stroking the crank while retaining the same basic displacement (396cc on the F; 397 on the E) obviously means the piston is smaller in diameter. An 82mm cast-aluminum piston (vs. the E's 85mm) pumps up and down inside a trimmer cylinder casting, and a new combustion chamber shape works with a lowered compression ratio (7.4:1 vs. 7.59:1) to further aid the midrange. Although the stroke increase alone could have bettered the power delivery without one single change in the port timing, the port locations and exhaust pipe dimensions were juggled nonetheless to achieve optimum torque output.

What makes all these engine changes worth crowing about is that the YZ400 finally runs the way an Open-Class motocrosser built by the world's largest producer of dirt bikes *should* run. When you thwack the throttle wide-open now, my friend, you had better have someplace to go. Because like it or not, you're *going*.

No peakiness, no wild wheelspin, no uncontrollable explosions of horsepower. Just hard, fast acceleration that will instantly billow the sleeves on your jersey and give those Maicos and Huskys something new to worry about.

There are a number of conspicuous differences between the YZ400F's power delivery and that of its European-bred competitors, though. For starters, the Yammie is still a tad light in the flywheel inertia department, stroked crankshaft or not, but that doesn't seem to get in the way of tractability. The YZ latches onto the racetrack surface exceptionally well, be it hard, slick adobe or deep, gooey mud. The heavy-flywheeled Euro-bikes might hook up a bit more effectively only when accelerating on the most treacherous surfaces one might encounter in a motocross.

Call that a disadvantage if you must, but the Yamaha can counter with a few assets of its own. The 400F makes considerably more horsepower than either the Maico 400 or the Husky 390 CR, plus it has just as much peak torque and it can rev, freely and with real authority, 1000 rpm higher. The YZ's power curve is not as flat, but there's more of it. The net effect is that the Yamaha feels like the fastest Open-Class machine around—which it just might be.

A new set of gearbox ratios intensifies the engine performance by matching the profile of the re-thought powerband almost perfectly. Second-gear holeshots are simple, third-gear starts are entirely possible; yet 85 mph is not out of reach in top gear. And to subsidize easier, faster shifting, the engaging dogs on all the gears use two degrees less undercut than on previous YZ400 transmissions.

The new engine's contribution to performance extends further than power curves or gear ratios, though. The powerplant's lightness is instrumental in improving the bike's handling through weight reduction. Overall, the YZ400F is about 10 pounds lighter than the

YZ400E, and most of that savings is in the engine. Moreover, the F-model feels even lighter on the track than its 226 pounds would indicate, encouraging the rider to perform quick maneuvers and toss the bike around like it were a 250.

Not all of the YZ400F's light "feel" can be traced back to its weight loss. Rethought geometries and new dimensions run rampant throughout the chassis, most of which contribute to the added nimbleness. A full degree less steering head angle and about half an inch less front wheel trail, for instance, have greatly improved and quickened the YZ's steerability. It is still reassuringly stable and controllable everywhere, but the 400 can now snap around tight, flat corners almost as well as the legendary Maicos and *better* than the Huskys. And even though there is more wheel travel at both ends, the engine is no higher than on the YZ400E and a "swayback" dip in the frame, between the two-gallon gas tank and the rear fender, drops the seat height to 36.5 inches, an inch *less* than last year. What this means is that the overall center of gravity with a rider on the seat is lower than on the E-model, further enhancing the F's willingness to be easily manhandled.

Almost overshadowed by the sweeping changes elsewhere on the 400F is the upgraded suspension, which deserves a round of applause for its contribution to the YZ's competence. The Kayaba leading-axle front fork is more-or-less a longer-tubed, longer-travel version of last year's unit, but that's not to be construed as a bad recommendation. The fork does the usual good job we've come to expect from all Kayaba air/spring front ends, smoothing out the bumps as well as any stock fork in existence—with the sole exception of the much-praised but not-yet-equalled Husqvarna front suspension. The YZ's only perceptible fork-fault can be experienced when cornering on a certain type of choppy terrain. If the frequency of the ripples is just so, the fork will not respond quickly enough, letting the 3.00x21 IRC tire skitter ever so slightly.

An all-new monoshock unit highlights the rear suspension refinements. The De-Carbon-type shock is 1½ pounds lighter and has a new longitudinally finned aluminum main body for better heat dissipation. And despite its overall length being a couple of inches less than before, the shock's built-in piston travel is exactly the same. The half-inch of additional wheel travel comes from a new swingarm that has an increased wheel-to-shock leverage

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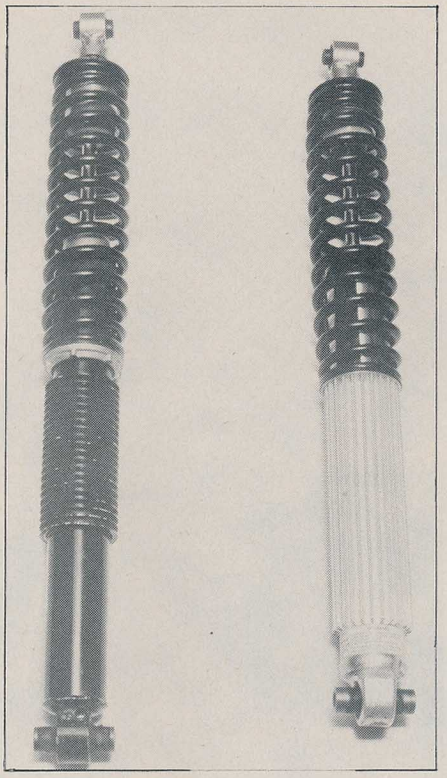
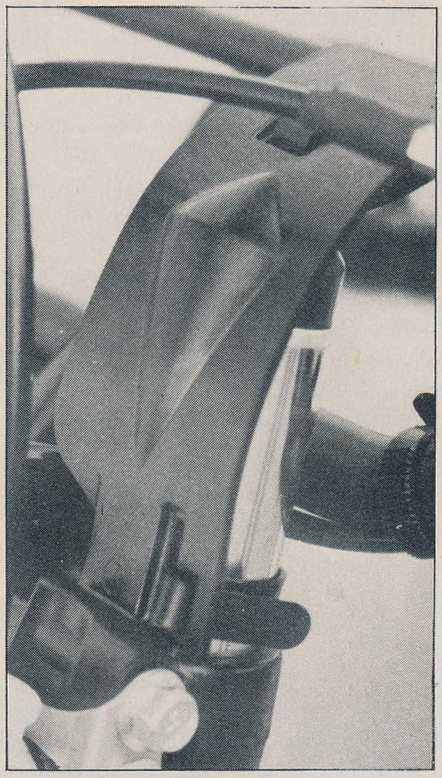


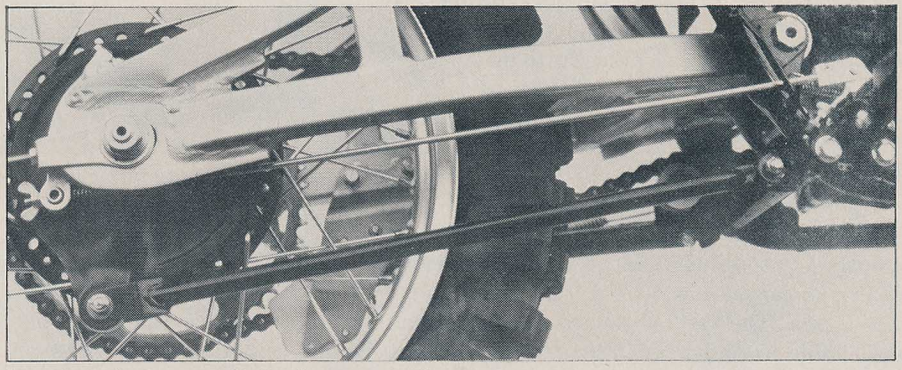
Rethought new monoshock unit (right)

Not just cooler looks, cooler oil.



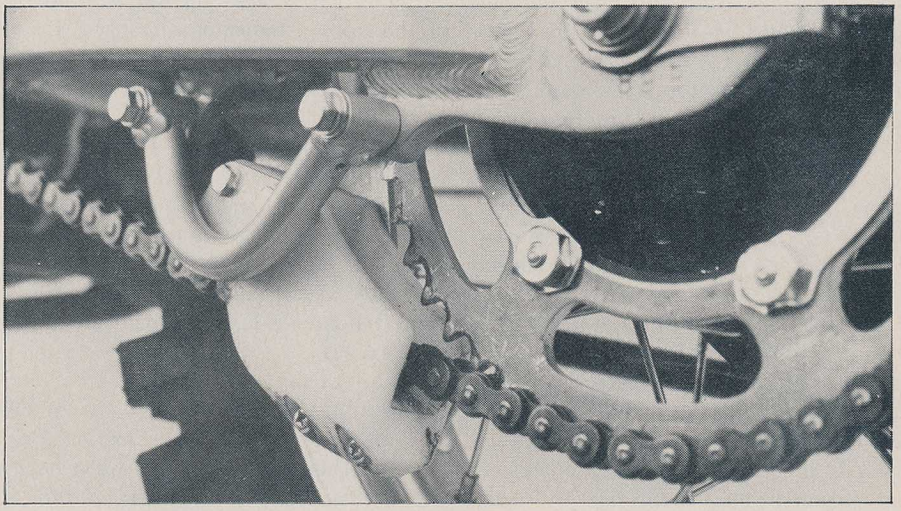
Front brake cable guard, stock for '79

Unsnagged is uncrashed.



Yamaha's first-ever full-floating rear brake

The hard-stopping secret is to keep the brake, not the wheel, floating.



The YZ's huge new nylon stationary chain guide

Keeping the power on the straight and narrow without the aid of springs.

ratio. The arm is also longer so the front pivot axle could be moved closer to the countershaft sprocket.

That leverage increase allows the springing and damping rates, as measured at the wheel, to be effectively softer, yet the shock uses the same spring as last year and has only minimally less average internal damping. In general, the rear wheel behaves superbly, displaying a better-than-ever ability to soak up the little chops as well as the big thumps. Truthfully, the rear suspension and the super-fat new 5.10x18 IRC knobby are almost as responsible for the YZ400F's impressive tractability as the engine improvements themselves.

Of course, there always seems to be at least one fly in every ointment, and on the rear suspension it's an annoying habit the rear wheel has of kicking up and making the seat whack the rider in the fanny. Fortunately, it only happens when he's up on the pegs and braking hard on ripply ground. Riders of 150 pounds or less should be able to hold this bucking-bronco act to a negligible level by swapping the standard monoshock spring for the softer of Yamaha's two optional coils (the other is stiffer than the stocker) and by turning the mono's externally-accessible, 25-position damping adjuster to one of its softer notches. Bigger riders need the stiffer spring and firmer damping, so they're pretty much forced to live with the problem.

A problem no 400F owner has to live with, though, is rear-wheel hop during braking. The top-shelf bikes in Yamaha's YZ line are now blessed with full-floating rear brakes. The rest of the 400's rear brake hardware and *all* of the front brake are the usual Yamaha stuff, which is to say that the bike has powerful, fade-free braking systems that are almost, but not quite, too sensitive. But touchiness notwithstanding, that full-floating feature promotes the YZ's stoppability up to the next level of effectiveness. And to prove that point conclusively, we slipped our test bike under four different Pro-class riders, all of whom regularly ride YZ400E Yamahas with non-floating rear brakes. To a man, they felt that the F slows down and stops so much better that they vowed to either get a new YZF or splice a full-floater onto their YZE.

Those same riders also agreed that the 400F vibrates less than the 400E. The F's heavier crankshaft no doubt has something to do with the added smoothness, but of equal value is the fact that you don't have to rev the engine as wildly just to make it do its stuff. So even if the YZ400F *did* vibrate with as much intensity as the YZ400E, it would feel smoother simply because the lower rpm requirements would produce vibes of lower frequency.

Yamaha's single-shock motocrosser, refined yet another time

Suspension that lets you down easy from dirt's lofty heights.

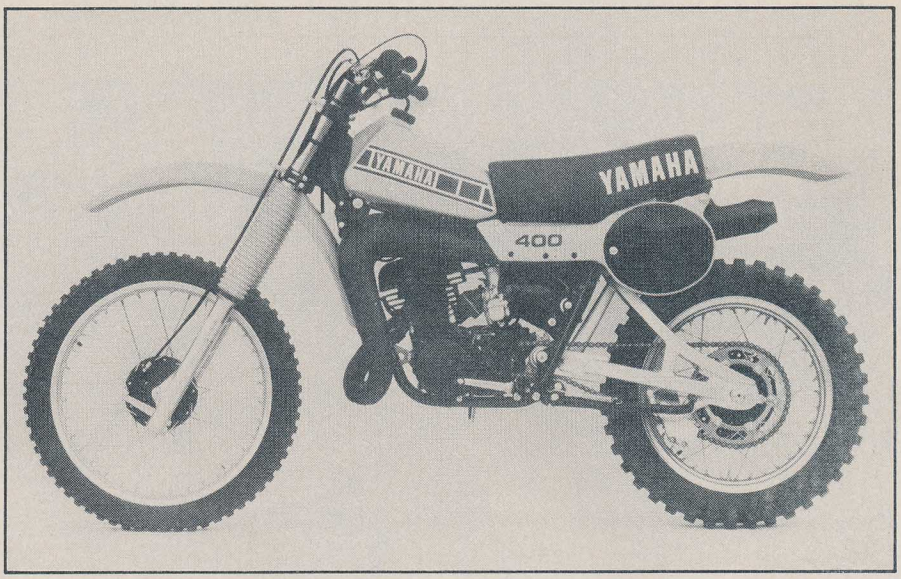
Still, our test bike transmitted sufficient vibration to break the welded-on part of the front exhaust pipe bracket. That problem, and a leaky shifter shaft oil seal, were the only reliability letdowns suffered by our particular YZ400F. Making a sturdier bracket or adding a third rubber-insulated pipe mount to the existing two would probably remedy the exhaust system problem, and more careful installation of the shifter-shaft seal during initial assembly of the engine would have prevented that oil leak from ever occurring at all.

Those two minor failures may seem like "little things," details too petty to be of any real concern. But they're not. Because on this very motorcycle, we've been shown—quite graphically, as a matter of fact—just how important the little things can be. Little things were what transformed the YZ-400 from a handful to a handler. Small details were what helped it go faster, let it steer better, caused it to feel lighter and made it stop quicker than last year's model.

In effect, those little improvements created a whole new motorcycle that can operate comfortably at the leading edge of the Open Class rather than fumbling around in the middle of the pack like the old one. The juggling of a few critical dimensions has, for the first time, given the fast, top notch riders good reason to buy a YZ400F. Because it can now duel head-to-head with Maicos and Huskys—and, of course, RM400 Suzukis—without giving away anything at all.

Consequently, you can now win races on a YZ400F just as easily as with anything else available off the showroom floor—not necessarily *more* easily, but certainly *as* easily. With all the exotic motocross equipment available today, that's as much of a checkered-flag guarantee as you're going to get with *any* motorcycle. ●

Yamaha YZ 400



SPECIFICATIONS:

IMPORTER: Yamaha Motor Corp., U.S.A.
6600 Orangethorpe Ave.
Buena Park, California 90620

CATEGORY: motocross

SUGGESTED RETAIL PRICE: $1939

ENGINE

Type	two-stroke vertical single
Port arrangement	one reed-valve-controlled intake, four main transfers, one booster transfer, one exhaust
Bore and stroke	82mm x 75mm
Displacement	396.1cc
Compression ratio (corrected)	7.4:1
Carburetion	one 38mm Mikuni slide/needle
Air filter	two-stage washable oiled foam: fine-cell main element, coarse-cell bristle-covered outer element
Lubrication	pre-mixed fuel and oil
Starting system	primary kick
Ignition	flywheel magneto CDI
Charging system	none

DRIVETRAIN

Primary drive	helical gears
Primary drive ratio	2.608:1
Clutch	wet, multi-plate
Final drive type	#520 chain (⅝-in. pitch, ¼-in. width)
Final drive	50/14: 3.57:1

Gear	Internal gear ratio	Overall gear ratio	MPH per 1000 RPM
I	2.38	22.17	3.5
II	1.75	16.30	4.8
III	1.32	12.29	6.4
IV	1.05	9.78	8.0
V	0.83	7.73	10.2

SUSPENSION/WHEEL TRAVEL, IN.

Front	air/spring, 38mm-diameter stanchion tubes/10.7 in. (272mm)
Rear	monoshock, 10mm spring preload adj., 25-position adj. damping/10.4 in. (264mm)

BRAKES

Front	drum, single-leading shoe
Rear	drum, single-leading shoe, rod-operated

TIRES

Front	3.00 x 21 IRC Motocross GS-45V
rear	5.10 x 18 IRC Motocross GS-56F

DIMENSIONS AND CAPACITIES

Weight	226 lbs. (102.5 kg)
Weight distribution	45.6% front, 54.4% rear
Wheelbase	56.6 to 57.6 in. (143.8 to 146.3cm)
Seat height	36.5 in. (927mm)
Handlebar width	33.5 in. (851mm)
Footpeg height	15.4 in. (391mm)
Ground clearance	12.4 in. (315mm), at frame cradle
Steering head angle	29.5 degrees from vertical
Front wheel trail	5.0 in. (128mm)
Frame	tubular and stamped chromoly steel, double front downtubes
Fuel tank	plastic, 2.0 gal. (7.6l), no reserve
Instrumentation	none
Top speed (calculated)	86 mph (138 kph)

All weights and measurements are taken with machine unladen and fuel tank empty.

COMPARATIVE TEST DATA:

Make & Model	Horsepower	Wheel Travel Front/Rear, in.	Weight (fuel tank empty), lb.	Weight bias Front/Rear percent	Transmission, number of speeds
Yamaha YZ400F	36.9	10.7/10.4	226	45.6/54.4	5
Husqvarna 390CR	29.3	9.6/10.0	234	45.3/54.7	6
Maico 400 Magnum	30.2	10.0/9.8	226	46.9/53.1	5
Montesa Cappra 360 VB	32.5	9.5/9.8	232	45.2/54.8	4
Suzuki RM400C	30.6	9.9/10.0	237	45.5/54.5	5

PERFORMANCE: