



HONDA **CRF250R**
KAWASAKI **KX250F**
KTM **250 SX-F**
SUZUKI **RM-Z250**
YAMAHA **YZ250F**

**Charge of
the Lites
brigade**

BY RYAN DUDEK



DON'T LET DISPLACEMENT FOOL YOU: NOT only have 250cc four-stroke motocrossers edged 125cc two-strokes out of the picture, they've pretty much created a class of their own. Sure, the Lites class still is full of the youthful spirit associated with 125cc bikes of the past, but the level of performance is higher than ever, thanks to faster engines, lighter chassis and top-shelf suspensions. We now have bikes that are fiercely competitive for fast young racers yet easier than ever for anyone to ride regardless of age, gender or experience.

Honda and Suzuki have added a bit of excitement to the class for 2010 by equipping their Lites machines with fuel injection—a first for 250cc motocross bikes. Yamaha, meanwhile, stepped up

with an all-new chassis, Kawasaki improved what had already been a top contender, and KTM stuck to its guns, making only small improvements to its entry's engine and suspension. All this makes for a high-flying recipe that allows riders to get around the track faster and smoother—and have more fun!

We had no choice but to round up these five fabulous 250s and twist throttles until our hands were blistered and our butts chafed; it took that kind of dedication to figure out which one is the best Lites bike of 2010. Associate Editor Mark Cernicky even soil-sampled every bike here. So, if you'll excuse a few bent levers, slightly stretched throttle cables, overheated brakes and worn tires, here is the rundown...



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5th PLACE: KTM 250 SX-F

If you want to talk fast, look no farther than the 250 SX-F. The orange bikes from Austria are the most recognized in the enduro world, and they bring some of that character to motocross. For example, the SX-F is the only bike here with a six-speed tranny, good for versatility if you don't want to be limited to short-circuit MX. And saying that the KTM is the fastest bike in the group is accurate, but finding the power is another story. Bottom-end delivery is completely flat, with no immediate hit; the engine only starts doing serious business way past the middle of the rpm range. It's such a rev-happy engine that you have to "ride it like you stole it," keeping the throttle pinned wide-open and remaining at

4th PLACE: YAMAHA YZ250F

It was nine years ago that the YZ250F burst onto the scene as the first four-stroke to compete against 125cc two-strokes in what was to become the Lites class. Although that 2001 YZ250F deserves kudos for its groundbreaking achievement, the 2010 model falls a bit short of contending for a win here.

The 250's all-new bilateral-beam frame (like used on the 2010 YZ450) and heavily updated engine impressed us during our first ride; after all, those are big improvements over last year's model, as is the styling. So, it was no surprise that our testers felt the YZ-F raised their confidence levels. The chassis and motor work nicely together and result in a very predictable ride. Picking lines and staying in selected ruts comes almost like second nature.

But the YZ doesn't quite cut it in the power department,



higher rpm as much as possible. It does have the best over-rev of the group, so it will pull farther than expected in every gear, which means you usually don't have to shift as often.

That's not the only way in which the KTM is considerably different than the four Japanese 250s. All our testers commented on the SX-F's individuality and rated it the hardest of the five to get comfortable on when switching from bike to bike. Their complaints

ranged from awkward radiator shrouds to an unpleasantly hard seat to not being able to find an acceptable riding position in the cockpit.


Among the slight changes to the SX-F for 2010 are a new triple-clamp said to improve overall handling and revised fork settings. Despite that claim, the fork was deemed too soft by all testers who weighed more than 165 pounds. Nevertheless, the KTM's high- and low-speed stability is healthy, with decent front-to-rear balance in rough conditions. But the SX-F feels the heaviest of these five bikes, and its reaction to rider input is sluggish, so changing direction requires more effort than it does on the other 250s.

needing more oomph everywhere. The motor is smooth, responsive and revs a lot but doesn't have the power of the other bikes here; turning the twistgrip farther changes the exhaust sound more than it increases the power. Though the jetting was spot-on, the carburetor caused the engine further problems, allowing the YZ to bog on hard jump landings. This was a problem on the KTM, as well, but the injected bikes had no such issues.

No complaints with the chassis other than being rated as "average" by several testers. At 217 pounds, the Yamaha ties with the Honda as lightest bike, but it doesn't feel nearly as light. The YZ takes more effort to get turned but does offer a good combination between turn-in and stability.

Really, though, there is nothing that makes the YZ stand out in any area. It's a bike that does everything well but nothing great. It offers a few niceties like a Pro-Taper handlebar, adjustable triple-clamps and wide footpegs that contribute to the YZ having the most comfortable cockpit. Plus, it and the KTM are the only bikes with warranties, even if they are only for 30 days.





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3rd PLACE: KAWASAKI KX250F

Since its introduction in 2004, the KX250F has been no stranger to winning, as witnessed by its multiple championships. For 2010, the KX-F has been subject to a lot of updates, but they have not changed the bike in a significant way compared to the previous model. That's okay for the most part, because a lot of those changes are for improved durability while others simply take a good thing and make it better.

In engine performance, the KX-F has excellent midrange and top-end power but lacks a little punch right off the bottom where it lugs instead of having an abrupt pull. It has good over-rev, though, so the Kawi probably won't need to be shifted as often as the other three Japanese bikes. The Kawasaki's carburetion is the best of the jets-and-needle bikes, but its power delivery still isn't as crisp and deliberate as it is on the Suzuki or Honda, the only two injected machines in this test.

Testers had mixed

reviews about the KX's shifting. The gears engage fine when downshifting, but some of our riders complained of the tranny going into a false neutral if their foot remained on the lever after shifting up.

Our testers all agreed, however, that the Kawasaki's ergonomics fit them perfectly and that the new seat foam provides a nice combination of comfort and support/feedback. The chassis is very well-balanced, despite the fork being a tad on the soft side. New titanium-coated lowers keep fork action smooth while giving the bike a classy look. High marks also go to the Kawasaki for straight-line stability,

and for coming home second only to Honda in terms of having a lightweight feel that gives its rider the impression that he always is in control. Making direction changes is an easy task but front wheel tracking through corners is not the best. Overall, though, the KX250F is an excellent motocross bike that just fell a few points short of coming out on top of this comparison.





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2nd PLACE: SUZUKI RM-Z250

Evidently, EFI is a very important factor on 250cc motocrossers because either of the two injected bikes in this test could easily have been the winner. Given Suzuki's struggles with the faltering economy and its complete absence of 2010 street models, we were happy to see the company announce a new RM-Z250 motocrosser and even more pleased when we found out how good the bike really is.

Suzuki was the first company to employ fuel injection in the 450 class since the demise of the short-lived Cannondale and has fitted a similar system on the 250. It's a batteryless arrangement that uses a 43mm throttle body and a progressive throttle linkage. Suzuki has reworked the rest of the engine, too, to bolster low-end and midrange power. Other improvements include a redesigned frame and revised suspension settings.

On the track, the RM-Z has the best engine, hands down. It pounds out strong bottom-end punch with zero hesitation, and the power stays potent all the way to the very top of the rev range. No wonder all the testers climbed off the Suzuki after their first ride with big smiles on their faces. Okay, one tester complained that the engine was too abrupt in its on/off throttle response. *Sissy!*

For quite some time, RM-Zs have been noted for their

excellent turning ability, and the 2010 model continues that valuable trait. In fact, of these five bikes, the Suzuki is clearly the best turner of the bunch. It has a balanced chassis and a certainty in its front-end feel that allow the rider to corner with precision and speed. The front tire sticks and the RM-Z finishes corners with confidence-inspiring predictability.

In terms of overall handling, the Suzuki is quite good. It sometimes can be a little twitchy on high-speed straights, but given its outstanding turning ability, this is a compromise that can be lived with. For the most part, the RM even stays completely straight on rougher tracks, causing those "oh, boy!" braking bumps to pose little threat.

But it's not all praises and accolades here. In a class where grams count, the Suzuki loses valuable points due to its weight. It's heavier than the others, which prevents it

from offering the easy flickability that is so important in Lites competition. Poor shift action also helps to keep the RM-Z250 out of the number-one spot; and when you mix notchy shifting with the heaviest clutch pull of the bunch, it's a recipe for a rider making mistakes all around the track. This is a terrific motorcycle that has some of the best performance qualities in all of Litesdom, but a few of its other traits are just enough to keep it off the top step of our shootout podium.





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1st PLACE: HONDA CRF250R

With its new frame, engine and suspension, the CRF250R really defines the term "all-new." It also is the second Honda motocrosser to switch from a carburetor to electronic, batteryless fuel injection. Amazingly, Honda was able to make the change to EFI without any weight increase, and just as impressive is the fact that the 2010 CRF250R actually *feels* lighter than the previous model. When riding the bike, you almost get the impression that it can be flicked around like a BMX bicycle.

This is why direction changes on the CRF are the easiest, allowing the rider to react to input almost instantly and make quick decisions. The Honda also has accurate steering and tracks around corners very well, though the front wheel doesn't feel completely glued to the ground as it does on the Suzuki.

Neither does the Honda have the fastest or meatiest engine here, but it is deceptively quick and has the best power delivery. Fueling is unsurpassed, allowing the engine to be crisp and responsive, with the bottom-end and

midrange output providing really stout acceleration. The power falls off on the top end, but the engine revs there so quickly that you almost don't mind, even though the comparative lack of over-rev means you might have to shift a little more often.

Really, the only thing holding the CRF back from utter perfection is its sometimes twitchy behavior on high-speed straights. But at least its suspension helps compensate for that behavior everywhere else on the track. It's hard to accurately describe the level of plushness to which the Showa fork and shock soak up chuckholes off jump faces or how the

rear tire continues to track over acceleration bumps. And big jump landings on the Honda feel more like you're touching down on a bed of feathers.

That level of competence and refinement is what this red racebike is all about. Its responsive power, accurate turning, plush suspension, effortless clutch pull and butter-smooth shifting combine to make the Honda stand out as the easiest and the most fun on which to turn fast laps. No wonder it's the best Lites-class motocrosser on the market. ☐



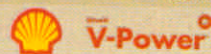
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cycleworld.com/250mxshootout
 VIDEO AND PHOTOS OF 250 FOUR-STROKE COMPARISON



SPECIFICATIONS	KTM 250 SX-F	KAWASAKI KX250F	YAMAHA YZ250F	HONDA CRF250R	SUZUKI RM-Z250
GENERAL					
List price	\$7498	\$6999	\$6999	\$7199	\$7199
Importer	KTM North America, Inc. 1119 Milan Ave. Amherst, OH 44001 www.ktmusa.com	Kawasaki Motors Corp., USA P.O. Box 25252 Santa Ana, CA 92799 www.kawasaki.com	Yamaha Motor Corp., USA 6555 Katella Ave. Cypress, CA 90501 www.yamaha-motor.com	American Honda Motor Co., Inc 1919 Torrance Blvd. Torrance, CA 90501 www.powersports.honda.com	American Suzuki Motor Corp. 3251 E. Imperial Hwy. Brea, CA 92821 www.suzukicycles.com
Customer service phone	440/985-3553	949/770-0400	800/962-7926	310/783-2000	714/996-7040
Warranty	30 days	none	30 days	none	none
ENGINE & DRIVETRAIN					
Engine	four-stroke Single	four-stroke Single	four-stroke Single	four-stroke Single	four-stroke Single
Bore & stroke	76.0 x 54.8mm	77.0 x 53.6mm	77.0 x 53.6mm	76.8 x 53.8mm	77.0 x 53.6mm
Displacement	249cc	249cc	249cc	249cc	249cc
Compression ratio	12.8:1	13.2:1	13.5:1	13.2:1	13.4:1
Carburetion	Keihin FCR-MX39	Keihin FCR-MX37	Keihin FCR-MX37	Fuel injection 50mm Keihin throttle body	Fuel injection 43mm Keihin throttle body
Transmission speeds	6	5	5	5	5
SUSPENSION					
Front suspension:	WP, 48mm dia.	Showa, 47mm dia.	KYB, 48mm dia.	Showa, 48mm dia.	Showa, 47mm dia.
Claimed wheel travel	11.8 in.	12.4 in.	11.8 in.	12.4 in.	12.2 in.
Adjustments	compression and rebound damping	compression and rebound damping	compression and rebound damping	compression and rebound damping	compression and rebound damping
Rear suspension:	WP	Showa	KYB	Showa	Showa
Claimed wheel travel	13.2 in.	12.2 in.	12.0 in.	12.6 in.	12.2 in.
Adjustments	high- and low-speed compression, rebound damping, spring preload	high- and low-speed compression, rebound damping, spring preload	high- and low-speed compression, rebound damping, spring preload	high- and low-speed compression, rebound damping, spring preload	high- and low-speed compression, rebound damping, spring preload
CHASSIS					
Weight:					
Tank empty	221 lb.	218 lb.	217 lb.	217 lb.	222 lb.
Tank full	234 lb.	231 lb.	228 lb.	226 lb.	233 lb.
Fuel capacity	2.1 gal.	2.1 gal.	1.7 gal.	1.5 gal.	1.7 gal.
Wheelbase	59.0 in.	58.2 in.	58.0 in.	59.3 in.	58.5 in.
Rake/trail	26.5°/4.8 in.	27.4°/4.7 in.	27.5°/4.7 in.	27.3°/4.6 in.	30.0°/5.5 in.
Seat height (unladen)	37.5 in.	36.8 in.	37.4 in.	37.0 in.	37.0 in.
Footpeg height	16.5 in.	16.3 in.	17.0 in.	16.1 in.	16.0 in.
Footpeg to seat top	21.0 in.	20.5 in.	20.4 in.	20.9 in.	21.0 in.
Ground clearance	13.0 in.	12.5 in.	13.1 in.	12.6 in.	12.8 in.

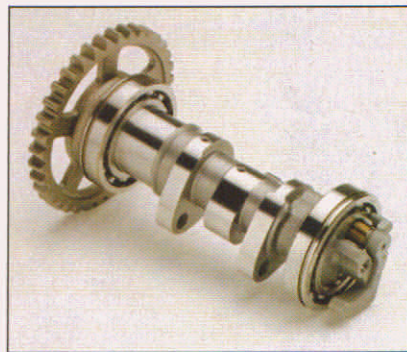
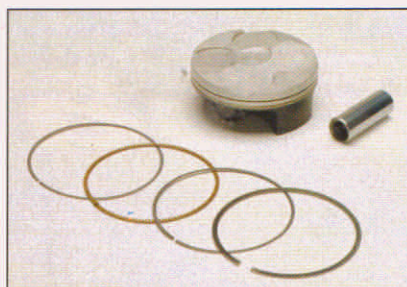
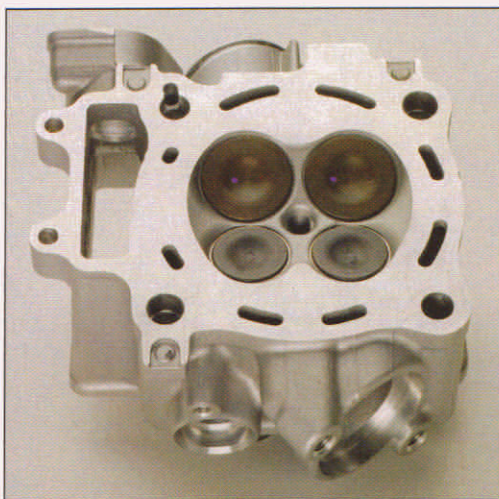
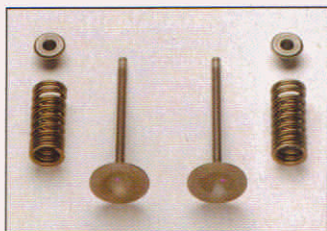
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HOUSE OF REVS

A look inside these phenomenal 250cc four-strokes

BY KEVIN CAMERON



Every ounce counts: Four-strokes make power with revs, and as revs rise, weight of moving engine parts must fall. The Honda CRF250R's pieces shown are good examples. Intake valves are titanium, camshaft has holes under lobe peaks and a short wristpin rides in a piston tall enough to hold rings and offer just enough skirt to get the job done. Designers juggle compression, cam timing and bore/stroke ratio and many other factors when tuning power curves.

ENGINEERING IS THE ART OF ELEGANT COMPROMISE. EVERY COMPANY'S design team faces choices dictated by physics, technology and budget, and each of these five four-stroke 250cc motocross engines reflects this decision-making.

Three—the Honda, Suzuki, and Kawasaki—have balanced power curves, with something off the bottom, solid midrange torque and strong top-end. The KTM is a revver, making the most peak power of the five but weaker below that. The Yamaha has the opposite character; its strength is on the bottom.

Compare 250cc MX power with Superbike power: A strong 250 MXer makes 36 horsepower, but one Superbike cylinder makes 52 hp. Why? Motocross is a different job, needing an engine that pulls hard at all rpm while the rider copes with terrain and a crowd of mad rivals. You engineer this by downsizing the intake ports to deliver peak torque *far below* peak power. Superbike peak torque is only slightly below peak power, but MX peak torque belongs in the middle of a wide, useful range—2500 or 3000 revs below peak power. This gives 250 four-stroke engines amazing pulling range.

Small ports deliver high intake velocity because a fast-moving intake charge can keep right on rushing into the cylinder from its own inertia, even after the piston rises on compression. If we set peak torque at 8500 rpm with small streamlined ports, fluid friction cuts flow steadily as revs increase, but power continues to rise because, for a time, revs rise faster than flow falls.

Any manufacturer could get Superbike power from its engine, but the result would be a slow and hard-to-ride MX bike. That's why testers review low-end (around 6000), ask how fast the engine "builds revs" and about peak power plus overrev.

All five engines here have close to a 77mm bore and 53-something-mm stroke—a ratio of about 1.4:1. This is racy, but not extreme. The Honda was at 78 x 52.2mm but came back to 76.8 x 53.8mm. The wider you make a combustion chamber at a given compression ratio, the thinner it becomes. Such a thin chamber slows combustion by slowing turbulence—weakening top-end. Some makers—our example here is KTM—lower the compression ratio to make room for turbulence. But less compression weakens bottom torque. KTM's 12.8:1 compression versus the 13.2 to 13.5:1 of the others tells us

it is designed to make power at higher revs. It needs its sophisticated "beehive" valve springs and lightened valvetrain parts to permit this.

Honda, with the largest bore in '09, couldn't raise compression without losing flame speed. So it made the bore fractionally smaller, adding room for charge turbulence and allowing a small compression increase. This is compromise.

Manufacturer press kits often say "revised cam profiles." Best airflow wants instant valve opening and closing, but parts inertia forbids this. Fiercer cam shapes and ever-lighter parts push these limits. Four-strokes, making power from revs, need premium materials to handle the stress.

Yamaha's 250 is the only five-valve design, and it shows. When you add a third intake valve, it's harder to crowd fresh charge near the sparkplug. This, plus the compression needed for low-end torque (13.5:1), cuts flame speed on top, weakening power at high rpm.

Less friction equals more power. A single compression ring is common in racing, as are slick cylinder-wall surfaces like Nikasil. Often makers announce "a stiffer, stronger crank" because the less parts flex, the less friction there is. This goes for crankcase rigidity, too.

Dry or semi-dry sumps prevent oil sloshing onto the crank. Flow paths are straightened. Rods are polished to suppress cranking. Titanium valves (the Honda retains steel exhausts) cut weight 40 percent. Lighter valvetrain allows less spring pressure—with micro gains from less friction.

Carburetors can still do the job—but nothing is as fine-tunable and zero-gravity-proof as digital fuel injection. Museum time for carbs.

In sum, what we have here is a three-to-two vote in favor of the all-around powerband style of the Suzuki, Kawasaki and Honda. The KTM's extra top-end is for riders able to use it on bogless tracks. Yamaha continues to engineer around its signature five-valve concept, but detail improvements don't mask this engine's bottom-centered performance. Tellingly, Yamaha's YZ450F and YZF-R1 now have conventional four-valve heads.

Admirable as these four-strokes are, users have found them expensive to keep at their best, subject to occasional \$3500 blow-ups. Many an "MX dad" has asked his district referee if there's any way to bring back that simple machine, the two-stroke. □