

# XL1200C SPORTSTER

**Hard Dog Tamed  
with Rubber  
Biscuits**



by Dave Searle

**T**HREE OUT OF every ten motorcycles Harley-Davidson sells are Sportsters. And from a marketing standpoint, 70% of them are sold to first-time H-D buyers. A positive experience with that first purchase should ideally create Harley riders for life, and as you know, you only get one chance to make a first impression.

So, when the engineers got the green flag to redesign these machines, they didn't flinch from giving them a cold, hard appraisal right up front. And, in fact, we were impressed to learn MCN's survey of Sportster owners (done back in June of '98) was used as a guide for the team's efforts.

Our survey indicated that the Sporty's extreme engine vibration and the multitude of failures it caused in everything from bulbs, instruments, oil tanks and even frame tubes was the bike's biggest problem.

That was obvious, but eventually, the team identified its main goals as four:

- 1) To reduce the vibration without losing the Sportster "feel." And, because a smoother engine would allow riding longer, harder and faster than before:
- 2) The engine would need to have improved durability (and fewer oil leaks).
- 3) Enhance the styling; that is, to bring it into the future while maintaining the distinctive Sportster "look."
- 4) Enhance the ergonomics.

Although these goals sound modest enough, the effort to meet them left almost nothing unchanged or un-improved.

For 2004, the seven models previously offered have been cut to just four: the 883, 883 Custom, new 1200R Roadster and the "flagship" 1200C (our test bike).

## ENGINE

To allow a higher redline—from 5500 to 6000 rpm—new connecting rods both stronger and lighter were designed using finite element analysis software. These support new lighter pistons fitted with a new high speed ring package to better contain combustion pressures. Of course, the lighter reciprocating parts also reduce inertial forces (the actual source of vibration).

Engine efficiency is also improved with a new engine management system, which relies on a new crank-mounted, 32-tooth position sensor (similar to the design of the Big Twins) for super accurate ignition timing. The old ignition trigger, which was cam-mounted under the classic "volcano"-shaped timing cover, is gone, but the bulge in the cover remains for heritage's sake.

In the past, Buell's engineers worked independently from Harley-Davidson's, but this time the designers of the new Buell XB12 and Sportster engines worked side by side, so the two machines share certain parts. The cylinder heads, an area where the Buell designs far exceeded the performance of stock Sportster parts, are now the same, as is the compression ratio, now 9.7:1. Also, the new XL1200 is fitted stock with "W"-spec cams, formerly the hi-perf. grind.

The factory claims the changes raise hp 15% across the range compared to a stock '03 model, from 60 to 70 hp at peak, and make 79 lbs. ft. of torque at 3500 rpm. On the dyno we achieved 58 hp, and compared to our last high-performance Sportster Sport, we found a significant improvement at the low range, tapering to just a slight boost at upper rpm, plus with a significantly smoother powerband across the board.

In addition, the engineers went to "great

pains," to improve sealing. Only the cylinder base gasket is now still paper. Elsewhere, redesigned rocker boxes and new valve-lifter blocks, a variety of new rubber composite gaskets, new fasteners and seals all improve oil-tightness. And rather than wait for the '04 models to make the improvements, because some parts, such as the new rocker box gaskets, were able to be used in 2003 machines, these were introduced as soon as they were made.

To increase durability, engine cooling was a paramount concern: Bigger cooling fins on the cylinders and heads achieve a 40° reduction in combustion chamber temperatures, and now oil jets also cool the undersides of the pistons.

Oil "carryover" (oil getting into the air cleaner) has been another long-time Harley complaint. This was dealt with in three ways. Inside the cylinder heads, oil drains now run to the camshafts rather than the cylinders, scavenging the oil better. Also, the breather holes to the air cleaner are smaller, just .060". And the breather itself, an umbrella valve, is now in a new casing, fitted with a labyrinth trap and a coalescing pad designed to collect oil mist into droplets that will drip into the head. The result of these efforts is a 70% reduction in oil carryover in H-D's own tests.

## TRANSMISSION

The internal shift linkage, another area of Buell superiority, is again revised for 2004, and now shared between the two motors. Changes were designed to eliminate over-rotation of the shift drum, making gear selection more positive. And it is now much easier to find neutral, a very important consideration for first-time riders. To reduce shifting effort, a ball bearing is used on the shift selector wheel, a trick invented by Marc Salvisberg at Factory Performance.

Other details: Secondary gearing is now taller on the 1200 for more relaxed high speed cruising rpm. And the clutch lever effort has been reduced by 8% to help to make the bike more friendly to less muscular riders (or ladies).

## SUSPENSION

To get the bike closer to the ground, the fork travel has been decreased by .5" and the rear suspension (on the custom) is very short, just 2.4". While the effort to make the bike fit a shorter rider is commendable, we found the rear travel is insufficient for rougher roads unless you slow way down. Also, we found the fork action numb, with less feedback than we'd like.

## BRAKES

New brakes are fitted this year, made by Nissin. Where the Sportys used to wear up-

to-the-minute, four-piston, double action calipers up front, they now use two-piston single action units styled to look like single piston models. The factory claims the change gives a reduction in initial lever effort but no reduction in stopping power. And while the feel is actually quite good in average use, we achieved a best stop from 60 mph of only 123.7'. But, looking back, our last XL1200S (Sportster Sport) with double front discs and twin four-piston front stoppers managed a lot better 114.5'. But it also weighed only 526 lbs. wet, compared to our new rubber-mounted XL1200C that now scales 585 lbs. Naturally, the suspension's spring rates have increased to match the greater vehicle weights.

## HANDLING

The engineer's challenge: Isolating the engine vibration from the chassis prevents using the engine as a chassis-stiffening stressed member. And even though the old chassis was none too stiff, in order to look like a real Sportster, the new chassis had to remain slim.

Similar to what the factory had done with the rubber-mounted Dynas and Touring models, the new mounting allows the engine to rotate radially in the frame as it dissipates the rotational mass of the flywheel, pistons, etc.. To create a measure of resistance to lateral deflection and thereby stiffen the connection between the steering head and swingarm as much as possible, the bottom link is positioned under the swingarm pivot, the top link under the steering head, and the third is in front, at the base of the forward cylinder. Also, to minimize the effect of rear suspension movement from pulling at the engine mounts, the spring rate of the rear rubber mount is higher than at the front.

Robotic frame welding is now used to achieve such accuracy that the dogbones themselves are not threaded for adjustment, as the frame is so precisely built.

The system works. H-D's engineers measure vibration in "inches per second" velocities, and the Sportster's is now virtually the same as the company's counterbalanced Softails, and rubber-mounted Touring bikes and Dynas. Before, the Sportsters' vibration had been fierce, and you really felt it at the handgrips. On the new machine, at 80 mph, the grips measure just 1.5"/sec. But it had been 3½-4" at the same speed. Now, the most noticeable vibration escapes from the left footpeg, but it's more than tolerable.

To accomplish the necessary stiffness, the frame was made much stronger, the backbone increased from 1½" to 2½". In fact by itself, it's 100% stiffer than the old one.

And although the rubber-mounted motor's new links do provide a stiffening effect, the combined engine/chassis stiffness is now a modest 26% better than before. Still, the result is noticeably more precise handling feel.

Enhanced ergos have been achieved by repositioning the footpegs and handlebars 1½"-closer to the rider. Also, a new flat pan replaces steel tubing formerly used to tie the top of the subframe together, reducing seat height 18mm. Lastly, smaller handgrips (1½" diameter vs 1¾") allow a shorter reach to the levers and an easier grip for smaller hands.

## STYLING

Style-wise, the change to a wider, 150-section rear tire (from a 130mm) looks



much better, and required a new rear fender and rear subframe to implement. Interestingly, the engine was also moved right by about ¼" for tire clearance, but that also helped balance the weight from side-to-side.

On the engine, a restyled oval air cleaner, new look primary sprocket and derby cover, new two-piece rocker box covers and revised exhaust crossover help differentiate the '04 Sporty motor from the earlier versions. The repositioned exhaust crossover pipe no longer resides under the air cleaner, making the cylinders more prominent. Instead, it connects the mufflers from the backside, as was first done on the Dyna Glides. But, although visually much cleaner, the change also moves the pipes further outboard—greatly reducing lean-over clearance by a whopping 7° on the right and 5° on the left. The bottom of the forward muffler now grounds at even modest lean angles, and it can hit hard enough to lift the tires if you're not careful. That's really too bad.

However, a new oil tank on the right features a trick pop-up quarter-turn dipstick/filler cap so as not to foul the rider's thigh any longer, and the right side cover is now symmetrical with the oil tank to further clean up the bike's appearance. Even better,

both are now shaped to flow into the lines of the rear fender support for a much more integrated look. Oil tank capacity is also increased 12 ounces, and new air channels on its bottom assist in cooling.

Significantly, the Sportster's gastank is now offered in a larger 4.5 gallon teardrop shape as well as the classic "peanut" design. But although you might imagine you can now ride for hours and hours without stopping, the Sportster's seat prevents that. A new-for-'04, padded "U" shape, it squeezes the tailbone and forward parts tighter the longer you ride, and 60 or 70 miles is all we could stand between rest stops—style rules function once again. And the passenger portion is equally short range; narrow and sloping rearward for a sleek profile, your passenger will have to hang on tight. But we suppose you could pretend you're stopping often just for *their* benefit.

## FINAL THOUGHTS

Harley-Davidson's "core competencies," like paint, polishing and plating, are in splendid abundance on the 1200 Custom, and we especially liked the two-tone paint. The mirrors' longer stalks also now work well, and an integrated steering lock is now included. Also, a new serial data bus wiring, introduced on the V-Rod last year, allows fewer wires to process more info and makes H-D's security system available on

Sportsters for the first time, and also eases fault diagnosis. Harley speedometer accuracy is much better than the industry average, too, and we find that praiseworthy. We found 63.5 mph at an indicated 65—about as close as it gets.

The vibration reduction, added reliability (service intervals increased from 2500 to 6000 miles) coupled with just a modest price increase all improve the machine's value for money. And a new two-year warranty (doubled from last year's) indicates confidence in its newfound durability.

The new Sportster is light years ahead of the old in terms of rideability, as you can now rev the engine to redline without losing the fillings in your teeth. Plus, you've got more power to play with, too.

But, victims of their own success, Harley has prospered selling a Fifties look, but are now forbidden from correcting things like tail-heavy weight distribution, undersized forks, dim undersized headlights, etc.—all part of the Sportster's 'heritage.' The bike is still beautifully finished and fun to ride if you accept its short comfort range and speed limitations. That's not a bad thing, necessarily, it's just what it is.

And we suspect they'll continue to sell every one they can build. 🍀