

SPECIAL REPRINT



Endurance test final evaluation

BUELL

LIGHTNING XB12S



km

50 000 Endurance test final evaluation Buell Lightning XB12S

PRIMA

That's just the way these Buells are: finicky like Primadonnas. But plenty of people

By Gert Thöle; Pictures by Bilski, Gargolov, Sdun, Archive

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<< **New Rear wheel bearing and gearbox final bearing installed**

<< **Torn belt, new front brake disc installed**

<< **Exhaust baffle hangs**

<< **Cracked ignition coil**

<< **Torn belt**

<< **New kick stand, front brake disc and front wheel bearing installed**



THUNDER

are crazy about their dull roar, and the hardware is still in prime condition after 50,000 kilometers.





Experts remember: There were times when Buell owners were glad if they managed to ride a few thousand kilometers without the engine exploding. A painful experience for the customers and hard times for the company as well as the unfortunate dealers who had to carry the can for these failures. A small, independent maker would probably have gone down, but after the takeover by Harley in 1998, Buell managed to survive this phase in the parent company's care and pottered about busily on improvements.

The result was the XB series. Motorcycles that derive their special flair from

the staggering contrast between modern, sometimes even daring suspension technology on the one hand and the ancient V-two on the other. Ancient, because to this day, every Buell is based on the Harley Sportster engine back from the olden days. Air-cooled, long-stroked and with only two titanic valves, activated by giant pushrods.

Can stuff like that survive 50,000 kilometers? In the case of the endurance test bike, it can. And even without excessive

Coal deposits:
Oil carbon residue in the inlet; meanwhile there are improved valve stem seals



Arson: Both exhaust valves appear slightly charred, which doesn't impair the compression though

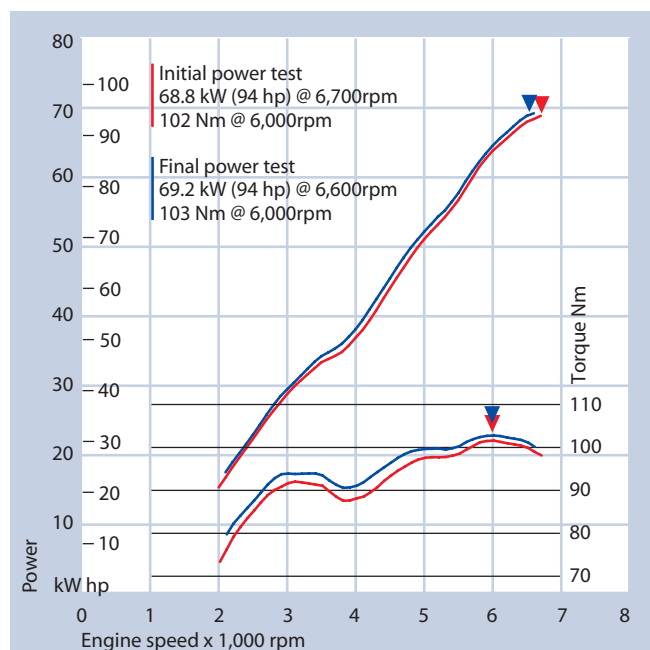


wear and tear inside the engine, whose design fascinates when you disassemble it: simple and with some impeccable craftsmanship. Plain traditional engineering that reminds you of the Golden Age before managerial cost-saving curbed the engineers: a shift fork made of pure bronze,



MEASUREMENTS

PERFORMANCE DIAGRAM*



*Power as measured on the clutch. Measurement on Dynojet 150 dynamometer, corrected according to ECE, maximum error ± 5 per cent

PERFORMANCE

Initial / final measurement	9,160 km	49,823 km
Acceleration		
0–100 km/h	sec 3.9	4.0
0–140 km/h	sec 6.5	6.6
0–200 km/h	sec 16.9	16.9
Pick-up		
60–100 km/h	sec 4.0	4.1
100–140 km/h	sec 4.7	4.7
140–180 km/h	sec 6.4	6.5
Average consumption in 50,000 km		
Fuel (98 octane)	l/100 km	5.5
Engine oil	l/1,000 km	0.24

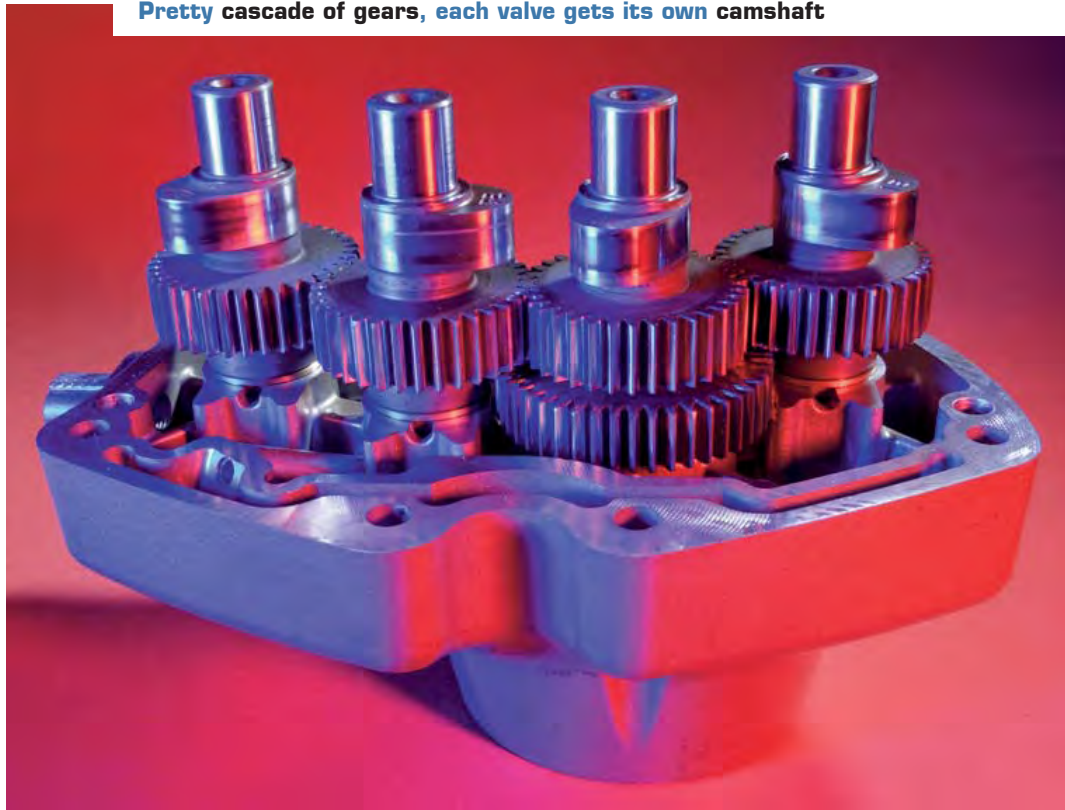
Same peak power, but even more torque at the end of the test

Pretty cascade of gears, each valve gets its own camshaft

massive bearing sleeves everywhere. Behind the right engine cover a cascade of camshafts, one for every valve. It all makes for enjoyable tinkering, except for the constant switches between metrics and inches.

However long you keep staring at the parts though, it remains a mystery how Buell manages to conjure around 100 hp out of this archaic monument. The fresh mixture first has to squeeze through a single intake tube, is then divided into two directions and flows through a daring chicane before ending up inside the two combustion chambers. Here, the valves stand at such a large angle that the chambers look like back in the fifties, when domed high compression pistons were all the rage.

Still, Buell supporters find the result convincing. Not a single one of the Buell owners who wrote to MOTORRAD regrets his decision. Whereas most of them are perfectly knowledgeable about the weaknesses of the design. Tire choice is a recurrent theme; basically everyone swapped the awkward OEMs of earlier model years, Dunlop D207s, for more appealing rubber. Model year 2005 had D208s as OEMs, Pirellis will be fitted in 2007. There is generally a lot of tinkering; hardly any Buell on the road has remained stock. Third-party exhausts to intensify the roar are very common. Still, many admit that the OEM can, while painted ugly and prone to corrosion, is a good choice as far as torque is concerned.



Build quality though is not only an issue on the exhaust system. Corroding bolts are especially annoying because they often seize very quickly. The paint job on the wheels is not very good either. On the test bike, it is already extremely scuffed,

albeit after two years of not very caring treatment and winter riding. But the overall impression is positive, all the other surfaces are immaculate, and in contrast to earlier, unpainted Harley engines, the block is completely unperturbed by water,

>> COSTS AND MAINTENANCE

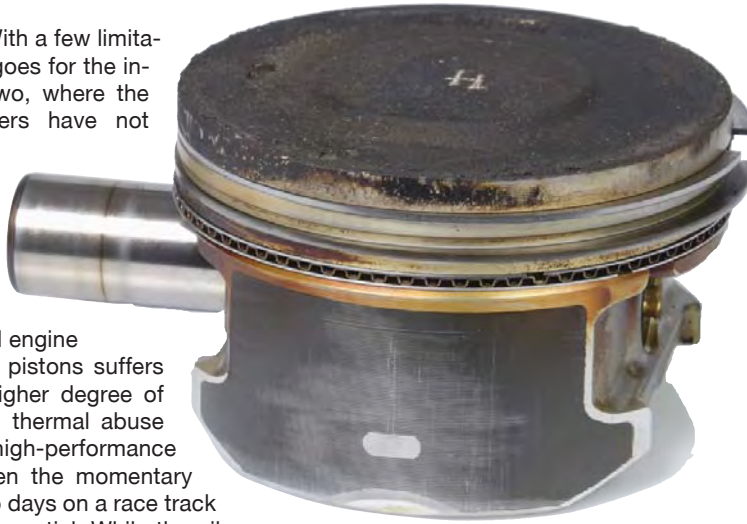
COSTS

Operating costs on 50,000 km	
24.5 L oil@13,68 Euro	335.16 Euro
7 oil filters@9.29 Euro	65.03
4 air filters@37.86 Euro	151.44 Euro
12 spark plugs@4,31 Euro	51.72 Euro
3 pairs of front brake pads@96.10 Euro	288.30 Euro
Fork oil	25.64 Euro
Brake fluid	38.68 Euro
Small parts, lubricants	25.54 Euro
Gaskets and seals	79.46 Euro
Service and repairs	1,730.07 Euro
Tires (including fitment, balancing and disposal)	3,636.50 Euro
Fuel	3,401.68 Euro
Total costs	9,829.23 Euro
Acquisition cost	11,809.00 Euro
Loss of resale value	4,809.00 Euro
Estimated price (dealer's resale price)	7,000.00 Euro
Costs per kilometer (without loss of resale value)	19.7 Cent
Costs per kilometer (including loss of resale value)	29.3 Cent

MAINTENANCE

	km-Stand
New front and rear tires installed, Michelin Pilot Power	4,850
New speed sensor (warranty) and front brake pads installed	8,470
New rear tire installed, Michelin Pilot Power	9,374
New front and rear tires installed, Metzeler Sportec M1	13,200
New front brake disc, wheel bearing and kick stand installed (warranty)	13,200
New rear tire installed, Metzeler Sportec M1	17,450
New final drive belt installed after tear (warranty)	18,038
New front and rear tires installed, Dunlop D 208	20,881
New rear tire installed, Dunlop D 208	24,190
New ignition coil installed because of ignition failures (warranty)	29,200
New front and rear tires installed, Bridgestone BT 014	29,448
New control motor exhaust baffle installed because of stalling engine (warranty)	30,250
New spark plug installed to rear cylinder because of misfiring	30,505
New front and rear tires installed, Pirelli Diablo Corsa	32,779
New rear tire installed, Pirelli Diablo Corsa (still 50 per cent tread left)	37,858
New final drive belt installed after tear, new front brake disc and pads installed	38,982
New front and rear tires installed, Dunlop D 208, new rear wheel bearing and gearbox final bearing installed (warranty)	43,088
New front and rear tires installed, Metzeler Sportec M3	46,314

salt and crud. With a few limitations, this also goes for the inside of the V-two, where the 50,000 kilometers have not left a battlefield despite all prophecies of doom. Which deserves special acknowledgement, for an air cooled engine with such giant pistons suffers from a much higher degree of mechanical and thermal abuse than a modern high-performance in-line four. Even the momentary oil loss after two days on a race track proved inconsequential. While the oil consumption usually was inconspicuous, it may obviously peak on the track due to the high revs. Possibly, the engine then even blows out some oil through the breather. The Lightning is no racer, which it also



Securing evidence:
The piston skirt coating has already been nibbled off a bit, clearance exceeds tolerance

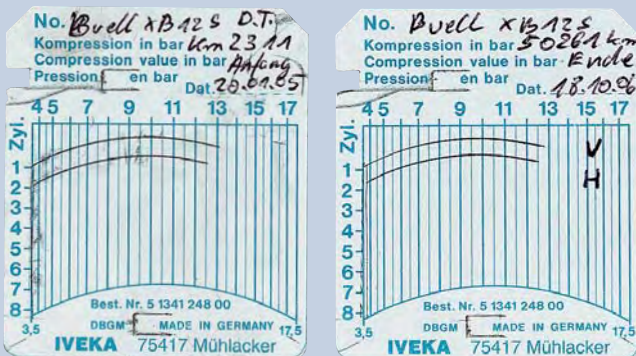


No mercy: Wear marks in the coating of the cylinders, perhaps caused by careless warming-up



EVALUATION AFTER 50,000 KM

COMPRESSION



Scorch marks on the exhaust valves have almost no impact on the compression.

CONDITION

Cylinder head: All valves are equally tight, but scorch marks on the exhaust side and oil carbon on the inlet valves; all cams have wear marks from the rollers of the hydraulic lifters, one exhaust cam and its rocker have slight pitting.

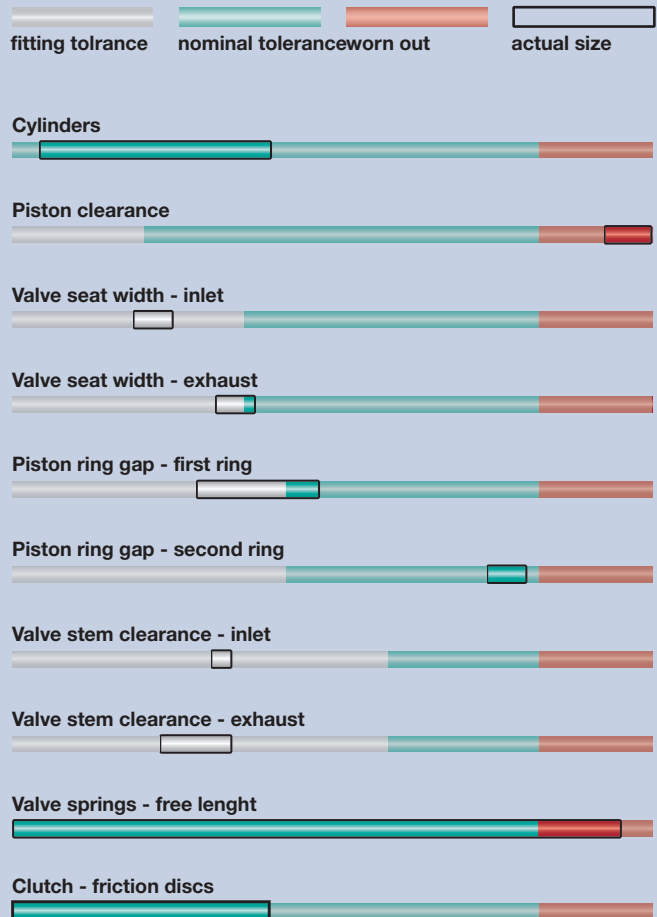
Cylinders/Pistons: Both cylinders are true to size, rear cylinder has scratches and visible wear. A small degree of oil carbon residue on the pistons heads, the rear piston exhibits stronger heat resultant discoloration than the front one, the operational profile of both pistons is even.

Crankshaft: The crankshaft and its roller bearings exhibit only slight wear, the same goes for the piston pins and the conrod eye.

Power train: The gear wheels are in prime condition, as is the clutch. The gear shifting drum has a few locking spots and visible wear on some corners of the guide-way, the shift forks also exhibit a degree of wear.

Frame/suspension: The coating of the frame and the swing arm leave a very good impression, as do the levers and other parts, but the paint of the wheels is partly flaked off.

WEAR





... on the torn belts.

An atypical defect. Since model year 2006, the upgraded belts with a high proportion of Kevlar do not even require scheduled replacement in a motorcycle's lifetime. With the older bikes, the durability of the belt may suffer due to improper rear wheel removal or installation or from bending the belt laterally. We refer to the rider's manual that comes with every bike and where the correct procedure is described, or recommend having a licensed Buell dealer install and remove the rear wheel.

... on the defective gear box final bearing.

This is obviously a material defect of the part installed in the test bike. We have no knowledge of any other cases like this. Identical parts have been used for many years in Buell and Sportster engines and have never suffered comparable defects. Any such defects are covered by our warranty or accommodation arrangements, respectively.

... on the misfiring.

Frequent short-distance operation can lead to damaged spark plugs, which have contributed to these failures among other factors. Starting the engine and quickly stopping it again also contributes to these defects. As of model year 2007, to counter this phenomenon the ECU has a modified mapping, which can be installed on older bikes by licensed dealers.

... on the two-times replacement of the front brake disc.

Within the scope of product advancement starting as of model year 2007 we adopt improved brake disc floaters. Worn floaters might cause damage to the disc if not replaced in time. In the case of a damage we refer to our accommodation arrangements.

... on the oil carbon residue on pistons and inlet valves.

We have no knowledge of residue to the amount found on the test bike from other bikes operated under normal conditions and with a similar mileage.

... on the occasionally higher oil consumption.

Extreme stress (heat build-up on the race track or extreme road testing) can lead to a slight increase in oil consumption with air cooled engines. Therefore, careful monitoring is paramount under these conditions. In normal conditions however, we have no knowledge of increased oil consumption. As to the correct measuring procedure, we refer to the rider's manual.

... on the corrosion on the muffler.

We know of problems on older models in combination with year-round duty. We therefore recommend the precautionary use of care products. As of model year 2007, the coating of the exhaust system has been improved.

Visual inspection:
Mike Nägele (CPO Neckartenzlingen, left), Ditmar Gruhn and Arnd Dickel (Buell Germany)





I'VE CLOCKED 53,821 KILOMETERS onto my 2004 model Buell XB12S - it would be many more if I had the time. At around 15,000 kilometers the horn broke off due to vibration, covered by warranty. The pinion of the oil pump was preemptively replaced ahead of schedule at about 18,000 kilometers as it was already well worn. At 22,000 kilometers there was a small oil leak on the gear shifter - the seal replacement was covered by the warranty. At 31,800 kilometers the shop re-tightened the bolts on the oil feed to the oil pump - cost covered by way of accommodation. The belt held, was replaced as scheduled at 40,000 kilometers. Oil consumption is still not measurable. Common problems of the XB are corroding bolts and badly routed wires that can get scoured. I have been riding bikes for 27 years now, from singles to six cylinders, two and four strokes - but the most riding pleasure I got out of the XB

Thomas Wanner

I GOT MY BUELL XB12SS IN APRIL, the clock currently shows 11,500 kilometers. During this period there have been two services and tire changes. Except for that, there were a few minor issues like two destroyed number plate illuminations. The plastics simply disintegrated and fell off, completely brittle. The muffler material is extremely low quality, you can watch it rust. I replaced it with a stainless part from HBA. Until now, everything else functioned flawlessly.

Andreas Woller



I BOUGHT THE XB12S IN APRIL 2005, and have since ridden about 12,500 kilometers. Fix a tank bag and you're off to Italy for a week. Seven days, 2,300 kilometers. Four days in the South of France, 1,900 kilometers. Day trips of 700 kilometers are also

easily manageable. This bike is a dream come true. And the 12S is absolutely reliable. Apart from that I trust the bike completely. Fuel consumption is between 4.5 and 7 liters. I always give her 100 octane fuel. Apart from the high wear, I was satisfied with the OEM tires. Currently I use Metzeler Roadtec Z6 which I shall stick to for the time being. I am completely satisfied with my garage and Harley Germany. Drawbacks are the somewhat small tank and the steep garage fees.

Bernd Kneer



I GAVE MYSELF A BUELL XB12S as a present for my 24th birthday. And behold, not a second of regret! For 35,000 kilometers it has been a faithful companion in the Alps, the Jura mountains and the Black Forest, even with a lady on the pillion (whose bottom was rather stiff afterwards.) Sound and performance chisel a grin on my face. The unique riding experience and the recurrent questioning glances of passers-by and other riders are priceless. Just an awesome bike. I don't dig the scruffy exhaust and the high but tolerable oil consumption though. But as we Swiss always say, "Eis hammer no emmer gno!!" He who takes good care of her will enjoy her for a long time. Thanks, Erik!

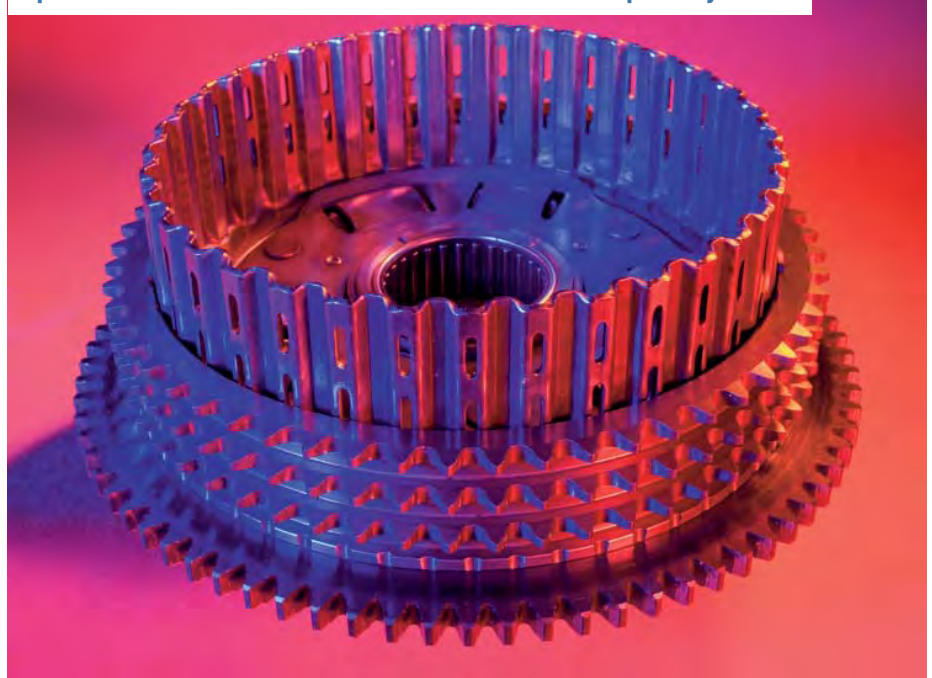
Andre Stirnemann

AFTER 25 YEARS ON THE MOST DIVERSE BIKES, the last two of which and 20,000 kilometers spent on a Buell XB12R, all I can say is: Riding has never been this much fun! Of course it all depends on what you want. Traveling with lots of luggage on long trips or a sports bike with plenty of power -- sorry, wrong number. But if you just want to rush to the twisties after work to surf a wave of torque, it will give you a grin that won't go away for hours. Even

makes clear with a misfiring engine after heavy braking. The reason: The fuel swashes to the front of the tank inside the frame, leaving the injection sucking on air. This never occurs in normal traffic though.

All in all the XB12S could have left a splendid impression if not for some unexpected mishaps and quirks in between. Like torn drive belts. Two of them actually. An annoying story. Buell claims it is an isolated case but it also happened to some of our readers' bikes. Since model year 2006 there has been an improved belt that only has to be replaced if necessary. The old one had to be changed after 40,000 kilometers. In any case it is advisable to treat the final drive with care. According to Mike Nägele, boss of the licensed dealer CPO, many mistakes are made when changing tires. As the belt is installed pre-tensioned, some riders force the rear wheel, twisting

Imposed on the clutch basket: Rows of teeth of the primary drive



on the race track this concept has its merits. Replacement exhausts are more for show (the factory can is known to rust quickly) as well as the unsatisfactory sound. Unfortunately, corrosion in general is an issue, every bolt lets you wish for more quality. The fan that you criticized so often can be silenced almost completely, even in high temperatures and fast riding, with a bigger right air duct. Defects in about 20,000 kilometers: defective steering head bearing at 15,000 kilometers, torn exhaust manifold studs on the front cylinder at 17,000 kilometers, and a defective front wheel bearing. Also you can save a lot of money by using non-OEM parts. For example: front brake pads, OEM 115 Euro, Lucas or EBC 35 Euro (and they also work better).

Martin Saure

I HAVE BEEN AN XB12SS OWNER SINCE SPRING. After breaking it in, I swapped the Dunlop tires for Michelin Pilot Power and went on a trip to the French Maritime Alps. After 3,500 kilometers I switched to Metzeler Roadtec Z6. I replaced the rear one after about 5,500 kilometers with the new Z3.

Current mileage is 10,500 kilometers. The bike needs only six liters of fuel on 100 kilometers despite fast riding. There have been no repairs up to now, but in the beginning, the engine sometimes just stalled. Removing the ominous white wire made this problem disappear. In the middle of the season I installed an HAS can and Rizoma handlebars. The Buell is a lot of fun, at least on back roads. I have not regretted buying it for a single second.

Hubert Hock, Karlstein am Main



or bending the belt in the process and thereby causing damage that reduces its life span dramatically.

The other nuisance of the test bike was misfiring whose cause could never be adequately explained. The spark plugs were changed, as were the ignition coil (with a noticeable crack) and the control motor of the exhaust baffle (after the onboard control unit gave out an error message).

Probably though, it was the commuting that kept destroying spark plugs in the winter, especially on the rear cylinder. Buell recommends to thoroughly warm up the engine once it has been started and making a point of not killing it again too soon. Whatever the cause, in spring the symptoms went away, and the whole rest of the year the Lightning ignited like a flash again.



KEIN EINHEITSLOOK

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All unscheduled malfunctions of the test bike were covered by the warranty. Like the twisted or rubbing brake discs for example, which, according to the importer, are caused by worn out floaters. On the test bike, dealer CPO splashed out on the first new disc after 13,000 kilometers, the next one was due for replacement after some 40,000 kilometers. Different floaters made of better material are supposed to remedy this problem as of model year 2006.

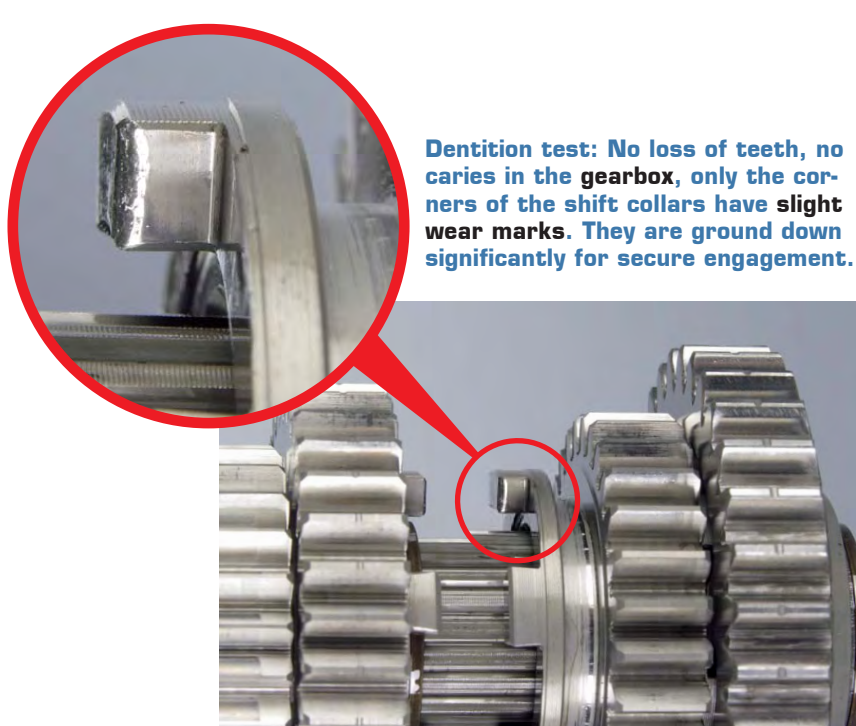
Just as a lot of other details, actually, that have been improved over the course of the last two years without the Yanks shouting it from the rooftops too loudly. Like the new swing arm with an improved belt cover or a more powerful oil pump with a hardened pinion, which by the way can be fitted to older bikes cheaply and easily. Also the ECU was modified to improve the throttle response and cold starting. The modified frame now accepts a little more fuel. The greater range is surely a good thing but was no real priority in view of the low fuel consumption. With an average of 5.5 liters per 100 kilometers the XB12S is a lot more economical than comparable two and four cylinder bikes, beaten only by the XT 660. It therefore competes exceedingly well regarding the total cost of ownership, and the loss of resale value is also strictly limited: For in the meantime, experts have learned that Buell engines have stopped exploding every few miles. ■

Causal research: A crack starts to open on the exhaust manifold, probably due to a momentarily loosened mounting bracket at the end of the test

















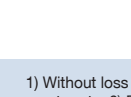
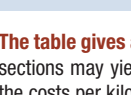
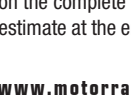

For aesthetes: The shift forks are made of solid bronze and exhibit little wear



Dentition test: No loss of teeth, no caries in the gearbox, only the corners of the shift collars have slight wear marks. They are ground down significantly for secure engagement.



ENDURANCE TEST RATING

Model	Points											Test in Motorrad*
	Costs per km ¹ in cent	Points	Fuel consumption ² in Liter per 100 km	Points	Loss of resale value in per cent ³	Points	Number of repairs ⁴ /breakdowns	Points	Points for wear / conditions ⁵	Total points		
 1. BMW K 1200 S	9.5	16	6.6	3	44	6	5/0	25	25	75	24/06	
 3. Suzuki V-Strom 1000	10.5	14	7.0	2	44	6	1/0	29	23	74	17/03	
 5. Yamaha XT 660 X	8.4	19	6.5	3	56	2	4/0	26	21	71	2/04	
 7. BMW R 1200 GS	8.8	18	7.3	1	54	3	4/1	21	25	68	1/06	
 8. Harley-Davidson V-Rod	10.5	14	4.8	5	53	3	3/0	27	18	67	6/06	
 11. KTM 950 Adventure	12.3	11	6.3	3	55	2	1/1	24	27	67	14/06	
 7. BMW R 1200 GS	6.1	23	6.0	4	50	4	6/2	14	21	66	21/05	
 8. Harley-Davidson V-Rod	11.8	12	6.5	3	56	2	3/0	27	21	65	4/05	
 8. Harley-Davidson V-Rod	11.2	13	6.9	2	41	7	8/0	22	21	65	17/04	
 11. KTM 950 Adventure	12.9	10	5.5	5	41	7	6/2	14	18	54	25/05	
11. KTM 950 Adventure	8.7	18	6.7	2	38	8	9/2	11	10	49	16/05	
11. KTM 950 Adventure	14.6	6	6.4	3	56	2	11/0	20	9	40	26/05	

1) Without loss of resale value and fuel costs; 2) Average consumption on 50,000 kilometers; 3) according to DAT estimate; 4) Unscheduled repairs; 5) Rates: size accuracy, visual wear, need of replacement parts; 6) Back issues can be ordered under +49 711 182-1229

The table gives an overview of the MOTORRAD endurance test bikes of recent years. Five sections may yield a maximum total of 100 points. Service and parts costs contribute to the costs per kilometer. The fuel consumption rating is based on the average consumption on the complete distance of 50,000 kilometers. The loss of resale value is based on a DAT estimate at the end of the endurance test. We rate the relation to the list price at the begin-

ning of the test. Every unscheduled repair costs one point. A breakdown where the bike could no longer move on its own power is penalized with a loss of five points. The rating of the technical condition is based on the wear and tear as well as the visual inspection of the parts. The Buell is in the rear of the field because of two torn belts and several unscheduled repairs.

AN AMERICAN MIRACLE



Cordially

Michael Pfeiffer
Editor-in-chief Michael Pfeiffer

WHEN MOTORRAD DECIDED TO CARRY OUT AN ENDURANCE TEST ON A BUELL, THERE WERE FIERCE DISCUSSIONS – about just how long you should subject the ancient design to the rigors of a long term test, with its overhead valves, pushrods and the extremely long stroke. Some said 12,500 kilometers, the optimists thought 25,000 kilometers was ample. One thing was clear though: The twin would not get any special treatment.

Commuting, long high-speed hauls on the autobahn and some stints on the racetrack – the usual fare a sporting motorbike has to cope with.

None of us initially spent a thought on pushing the powerful pushrod twin over the full distance. But the Buell ran and ran and ran. The engine even seemed to get smoother and smoother as time went by.

And now it has finally done it (see page 48ff), performing at a whopping 100 horsepower from its two cylinders even after some 50,000 kilometers. Mechanically, the unusual American appears to be completely healthy. A miracle?

If you take a closer look at its design, you quickly discover just how much work Buell has put into the engine. Camshafts rotate in bearing sleeves, conduits run in artful loops, a lot is amply oversized, good old metal from America.

And that lasts. Longer than a lot that comes from Europe. And so the unique MOTORRAD endurance test once and for all dispenses with a prejudice. One which not even the MOTORRAD editors managed to avoid completely. Well done!

Picture by Gargolov



The Buell on the slab: Only good things hide inside the V2. Who would have thought it?

Picture by Froberg

