

A note from the designers of the CrossCurrent



CrossCurrent
S-Pedelec

ODK U500
Utility E-bike

Juiced CrossCurrent: The backstory

Juiced Bikes is well known for creating solid and reliable utility e-bikes used as true car replacement vehicles. The ODK series of Utility e-bikes have dominated the segment, earning a nomination for **E-Bike of the Year at Interbike 2015**.

Utility e-bikes are ridiculously difficult to make; they're not used like normal e-bikes. As a side project, we decided to "mess around" in the sporty e-bike category as a way to test the latest torque sensor technology.

But rather than make something average and boring, we've created something fast, surprisingly polished, and *actually* sporty!

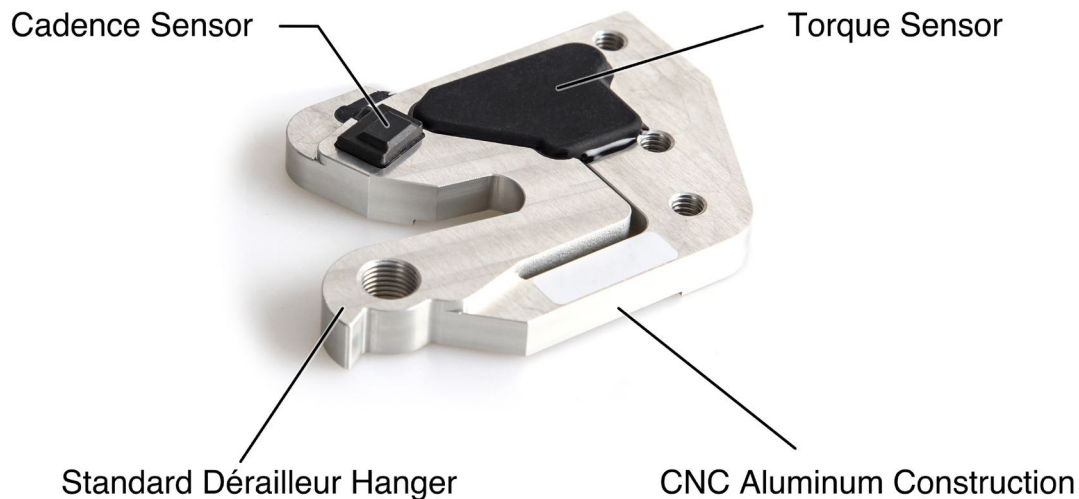
Aside from showcasing our design and manufacturing capabilities, we're demonstrating our ability to bring this product to market at an extremely competitive price, with proper dealer margins and the same degree of quality in technical support that earned the U500 a cult following.

Our new CrossCurrent now sets the benchmark in the sporty, high speed e-bike category.

The Torque Sensor: The final piece of the e-bike puzzle

A breakthrough in torque sensor technology allows us to introduce an e-bike that produces that bionic feeling, but at an affordable price point. This is the new standard for the e-bike. Butter-smooth pedal assist is no longer the exclusive domain of astronomically priced bikes.

Our torque sensor is integrated into the rear dropout. The sensor is carved from a solid block of 7000-series aircraft grade aluminum by a CNC mill, with slots for both torque and cadence sensor elements.



Yes, our dropout sensors have **BOTH torque and cadence** measurement capabilities. Torque is precisely measured one thousand times a second through the deflection of the metal with a total movement range of less than 0.1 mm.

The cadence is cleverly determined by measuring the interference to the magnetic field from the motion of the 11T rear sprocket. This signal is digitally processed and sent to the controller.

The amplification effect of the bike's gearing provides more than twice the sensitivity of any bottom bracket sensor, giving almost instantaneous response, ramping up and down smoothly and rapidly with the riders every input.

Unlike the TMM4 Torque sensor used on the Stromer and Easy Motion e-bikes which only measures torque, our dual sensor can rapidly detect when you actually stop pedaling, eliminating that delay, "waviness" and false signals over bumps as it is *the fundamental weakness* of their sensors.

This dual torque and cadence measurement capability contributes to the "connected" feeling that is impossible to achieve with just a cheap speed sensor found on nearly every e-bike at this price point.



Hydraulic Disc Brakes

We've thoroughly tested and compared all the disc brakes out there and found the **Tektro Dorado** to be the best performance available for e-bikes at any cost, period. These brakes are found only on very high end bikes like the Stromer ST1 S and Easy Motion EVO Nitro City as they are insanely hard to get.

All of our ODK Utility E-bikes come standard with this brake system, making us one of the biggest buyers of the Dorados. Now we bring this performance to our new CrossCurrent. After you experience this kind of braking performance, everything else will feel like junk to you.

Scalable Battery Pack System

Once again we lead the industry with our e-bike battery system.

We have chosen the popular Samsung cell down-tube battery setup with a few interesting twists missed by other manufacturers. First off, our system is **48V**, which allows us to reach higher speeds using lower amperage than a 36V setup. We also use a physically smaller pack length from everyone else which gives us more flexibility in terms of the frame design and controller placement.

Extended Range

48 V / 10.4 Ah

Standard Range

48 V / 7.8 Ah



We worked with the supplier to tool up a slightly taller battery, perfectly fitting the 13S cell configuration, giving 500 Wh capacity without any wasted space. We have a much larger battery capacity pack in the works; one which will be among the largest in the industry for this form factor.

This strategy lets us scale up and down the most expensive component of the bike. We can produce a bike to meet every customer's budget, yet retain compatibility among battery packs across the line. Every CrossCurrent can accept any of our CrossCurrent battery packs.



Big Gearing

We have selected taller gearing as this bike is capable of reaching higher speeds. You're not "hamster wheeling" at higher speeds, but you still have strong hill-climbing gears thanks to the large sprocket on the Shimano 9-speed transmission.

350W Motor Geared Motor

The new generation of Bafang SWX motor is built with **helical cut gears for silent operation** even at high speeds. High quality Shimano compatible Cassette gives a precision feel throughout the drive line and during gear shifts.

A freewheeling clutch produces zero cogging, compact dimensions and light weight makes the bike amazingly easy to pedal with the motor off.

Intelligent Controller

We use the newest generation of sine-wave controllers for very quiet operation. Sine-wave controllers effectively eliminates the "buzzing" associated with geared hub motors.

Automatic time-limited overboost mode gives a satisfying momentary burst of acceleration when needed without stressing the bike's electronics. All wires and connectors are waterproof and are run externally for greater serviceability.

Throttle Ready

If your customer wants a throttle, we have a smart ambidextrous thumb-throttle option paired with specifically programmed algorithms to interact seamlessly with the torque sensor. This detail was skipped over in the design of many e-bikes, resulting in a throttle that's non-functional when the torque sensor is in use or vice versa.

The throttle, of course, works at zero motor rpm which helps to get going from a stand-still when starting in the wrong gear, which happens to the best of us from time to time. The throttle is limited to 20 mph and 8 Amps, in compliance with all regulations.



Frame Design

We've paid special attention to the frame's geometry to give the bike that "real bike" feel that's missed on many e-bikes at this price point. The Q-factor, chain stay length, seat tube angle, and steering all feel totally natural. In ECO mode, the bike is indistinguishable from a respectable Hybrid/Cross-style bicycle; enough to surprise a bicycle purist.



We make the CrossCurrent in 3 Frame Sizes to accommodate different body types.

M 17.5" ***L*** 19.0" ***XL*** 21.0"

We've worked hard to include a standard water bottle cage mount. Pannier rack and mud guard bosses are included on the frame.

Display: Different strokes for different States:

We've designed 2 simple and easy to use displays to get around all the confusing e-bike laws. The standard display comes with SPORT mode allowing pedal assist to 28 mph. A non-sport display can be used so the bike can be sold with a 20 mph speed limit on the assist.



Class 3 Display



Class 1&2 Display

For Class 1 & 2 operation: 20 mph
without throttle / 20 mph with throttle

For Class 3 operation: 28 mph without throttle / 20mph limit with throttle

The controller automatically recognizes which display is being used and follows the rules set forth by the e-bike regulations.

Yes, you can use the throttle with the Class 3 display, but the throttle assist will cease at 20 mph.

Easy Serviceability

Electrical components need to be serviceable! True to our Utility E-bike roots, our goal is to make every one of our bikes as **easy to service as possible**. Our clean layout makes trouble shooting as easy as possible.

