



CRUZBIKE™

FRONT WHEEL DRIVE TECHNOLOGY

SILVIO

Technical Summary



Silvio Cruzbike – State of the Art in Ergonomic Road Bikes

The Silvio Concept

Take a powerful, fast, successful road bike rider. Place him on a stiff, minimalist frame with slick-shifting, efficient components. Add the rhythm of a fast cadence. A clean, cooling slipstream. A smooth, rolling ribbon of fresh asphalt. The glint of the sun as it lifts above the liquid horizon of a coast road morning ride. The piston-like syncopation of legs pushing and arms pulling. Every muscle focused on forward

motion and quickening pace. The visual grace of gathering speed – power smoothly flowing – rider to frame to wheels to road. Ascending, descending, cornering – apex to roll-out. Power. Control. Grace. Speed. The classic road bike experience. Now rotate the rider 90 degrees. Add some comfort; remove some stress. As for the rest – keep it all.

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Introduction

Silvio provides road bike enthusiasts the aesthetics, athletics, speed and functionality they've grown to expect, and adds the enhanced endurance, extended comfort and physiological preservation of recumbent cycling.



"It's a road bike, Jim, just not as we know it"

Silvio is first and foremost a road bike. Classic road bikes are characterized by:

- Frames optimized for efficient power transmission.
- Riding posture tailored for recruiting power from all muscle groups.
- Component systems designed to further the individual's riding style and engineered to perform together with complete compatibility.
- Wheel and tire systems that are lightweight, efficient and widely available.

Silvio is sold as a frameset. This allows riders to select components to suit their specific riding styles and budgets, and to purchase components as group sets to assure component compatibility and the finest possible mechanical

experience. The frameset approach also allows riders to transfer the group set from their favorite current road bike to the Silvio, potentially reducing initial investment in the bike.

Frame Design

Silvio combines aluminum and carbon fiber frame elements in a stiff triangulated structure with minimal off-vector material. The integrated, single-position seat is welded to a frame of teardrop large cross-section 7005 aluminum tube to assure a strong platform for the rider to push against. This frame is short-coupled to the headtube, which in this design is in the power transmission path.



Carboyoke rear chainstay

Silvio is suspended front and rear. While suspension is unusual in a road bike, Cruzbike has developed, in conjunction with a successful Taiwan recumbent and road frame manufacturer, a suspension system that adds virtually no weight while providing significant benefits for rider endurance and comfort in the context of 140 psi road tires. The suspension is visually characterized by its unique carbon fiber/metal composite "Carbostays", which operate both as chainstays and leaf-spring-type suspension elements.

For the rear suspension, the Carbostays work in conjunction with a titanium leaf spring and a progressive-rate elastomer to provide tunable

SILVIO

compliance and distribution of load inputs to the frame.



Titanium leaf spring and a progressive-rate elastomer



Adjustable air shock

In front, the Carbstays work with an adjustable air shock, internal to the fork steerer tube, manufactured by Kind Shock of Taiwan. A shock

pump is included and maximum pressure for the shock is 185 psi.

Components

The Silvio frame was designed to accept standard road component group sets. Initial prototyping was done with Shimano Dura-Ace ten speed components.

Bikes have also been built with Campagnolo nine and ten speed groups.

Derailleurs

A braze-on-type front derailleur is required, and the bottom bracket shell accepts any 68mm English-thread bottom bracket. Bottom bracket axle length is determined by group set manufacturer recommendation as for any road frame.



Any 68mm English-thread bottom bracket

The initial Silvio concept evolved around a double crankset, consistent with common road bike practice. Compact cranks are generally acceptable, but for riders at the 5th percentile of height, previously the chainstay angle that resulted from adjusting for a short x-seam could cause the chain to interfere with the front

SILVIO

derailleur cage if a triple crankset (30 tooth low chainring) was used. Because many customers accustomed to recumbent bikes preferred triple cranksets, Cruzbike now offers a redesigned front tube to accommodate a triple across the rider height range.

Rear derailleur selection is dictated by the cassette range, as with any bike. Larger low-gear cassettes will require a medium to long-cage derailleur.



Sandwiched derailleur hanger

The rear derailleur is attached to the front fork by a proprietary derailleur hanger that fits

between the Carbostay drop-out and the fork drop-out. An extended-length quick release is included with the frameset.

Brakes and Shifters

Silvio was designed for road drop handlebars, consequently “brifters” are the optimum choice for shifting and braking.

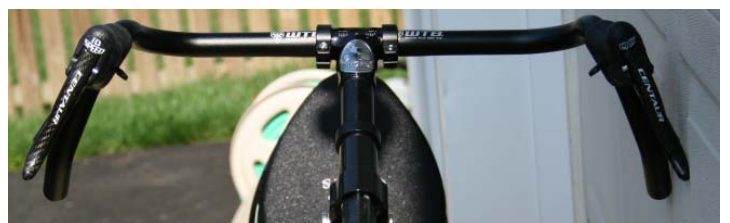
Bar end shifters have been evaluated, but they fall in an awkward position and cause the rider to disrupt arm power recruitment during climbing.



Brifters – the optimum choice for quality shifting

Handlebars

Silvio was designed for minimum 46 cm road drop handlebars, selected for minimum drop and reach. Wider bars improve knee clearance for brifters.



Wider drop bars give leverage and control

Two wider handlebars that are particularly well-suited to the Silvio – WTB “Mountain Road” bars

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(above) and Origin 8 “Gary” bars (below). These bars use angled drops which position the hands ideally for fine steering control, and offer increased knee clearance. The Origin 8 bars are shorter in reach and drop, and are particularly suited to shorter riders.



Origin 8 “Gary” bars compliment the overall form

Ergonomics

The entire design process for Silvio has centered on total body ergonomics, not just leg positioning, to optimize performance without sacrificing comfort. Backrest and seat pan angles serve to unload the tailbone while providing optimum hip and torso angles for

power output. The design of the telescoping front tube and bottom bracket carrier keep the bottom bracket low, and heel strike is eliminated by design.

The minimalist hard-shell seat design transmits rider leg force to the tetrahedral drive structure including the tube connecting the handlebar to the bottom bracket. This structure is the heart of Silvio’s transmission efficiency.

Conclusion

Silvio’s design is ultimately the product of intense customer involvement in the Cruzbike designs that preceded it. Multiple active customer forums continue to provide rapid feedback and a friendly relationship between the designers, business team and enthusiastic riders. For more information, visit:

<http://www.cruzbike.com/>

<http://www.cruzbike.com/forums/>



Silvio – comes as a complete frameset