

**Contact:**

Email: [tech.sales@coherent.com](mailto:tech.sales@coherent.com)  
[www.coherent.com](http://www.coherent.com)



## Eyeglass Manufacturer Sees Better Results with Laser Welding

### The Challenge

Austrian premium eyewear manufacturer Silhouette International maintains their competitive edge by producing eyeglasses that deliver superior comfort and functionality, as well as a stylish appearance. Their "Titan Minimal Art" (TMA) frames, which weigh only 1.8 grams, were the first screwless and hingeless eyewear made of titanium, and the success of this product has motivated Silhouette International to extend the hingeless approach to many other designs. However, this design presents several manufacturing challenges, including a need to join a variety of materials, such as titanium and other specialized alloys. And, these joints must be aesthetically pleasing, meaning they are not visually recognizable, and also don't produce a change in texture which can be readily felt. Finally, joints must be strong and very flexible, and have the ability to be cycled (folded and opened) many, many times without a change in shape or degradation in mechanical strength. Traditional resistance welding struggles to deliver in all these areas.

### The Solution

Laser welding is a well-established method that overcomes the limitations of resistance welding. But, implementing laser welding for this type of precision application in volume production, and in a cost-effective manner, required some technical innovations. One improvement that has proven critical for Silhouette International is the use of "beam wobble," that is, rapid motion of the beam both along and perpendicular to the weld seam. Coherent has developed an advanced implementation of beam motion called SmartWeld which enables more flexible and precise control of the heat distribution produced by the laser. It incorporates complex beam patterns, including circles, ellipses or even zigzags. SmartWeld improves weld quality and process consistency, and can also bridge larger gap widths in the welded parts. This reduces fit up tolerance and requirements, which speeds production and lowers costs.

### The Result

Silhouette International installed a Coherent MPS Rotary automated welding, cutting, and drilling system which incorporates a 200 W fiber laser source and scanner optics. Overall, it has reduced tooling and manufacturing costs by allowing multiple process steps to be performed in one machine, resulting in improved energy savings and productivity. Plus, the use of SmartWeld has improved weld quality, specifically producing joints with higher strength (due to the lower heat input into the part) as well as improved elasticity. The MPS Rotary also supports the company's need to reduce time-to-market for new designs, as well as to limited lots sizes (typically 150 - 300 pieces).

*"The move from resistance to laser welding has been a tremendous success, delivering an overall cost savings of about 80%. And, the improved precision and repeatability have been critical in enabling us to successfully bring cutting-edge eyeglass frame designs into production."*

— David Illitz, Process Manager Raw Part Production  
Silhouette International Schmied AG