OMRON

SUCCESS STORY

Alpine Laser uses Omron technologies to create the world's first purpose-driven laser processing workstation for medical tubing

ALPINE LASER

Alpine Laser
Industry: Medical Device
Bloomington, MN
www.alpinelaser.com

2-5 ↓
minutes for tooling changeovers

20% ↑
times faster than similar laser processing workstations

<0.0005"
positional error in Precision Regrip Module

Click here to learn more about Alpine Laser

Key Benefits

1. **Higher throughput.** The Medicut Pro is 2-5x faster than other workstations!
2. **Improved accuracy.** The workstation's Precision Regrip Module has less than .0005" positional error.
3. **Greater adaptability.** The Medicut Pro features three- to five-minute tool changeover and rapid prototyping.
4. **Better safety.** The Medicut Pro has a CAT III safety system.
5. **Improved serviceability.** The Medicut Pro uses off-the-shelf products that Alpine Laser stocks.

At a Glance

Stainless steel tubing is part of microcatheter shafts, structural heart valve frames, and other surgical materials that people's lives depend on. Medical device manufacturers need tubing cut with excellent precision, so laser cutting workstations are essential for this industry.

Instead of offering a general-purpose laser cutting workstation that could be tuned to provide tolerable results, Bloomington, MN-based laser cutting manufacturer Alpine Laser conceived of a 100% purpose-driven solution that would improve throughput, reduce changeover time, ensure operator safety, and simplify maintenance. This solution has been dubbed the "Medicut Pro."

Thanks to a careful consideration of customer needs, Alpine Laser's workstation is faster, safer, more accurate, more adaptable, and more serviceable than other options.

A purpose-driven solution from a company with in-depth industry knowledge

From the beginning, Alpine Laser had a clear objective. The company would use its detailed understanding of the medical device industry's business challenges to develop a laser cutting system that directly addresses the specific needs of end users. This "hyper-focus" on unique industry needs involved considering (and ultimately mitigating) the following challenges:

- New medical therapies that are moving from surgical (invasive) to interventional or transcatheter (minimally invasive), displacing traditional methods and ramping up capacity.
- Constraints in manufacturing capacity within the laser cutting space.
- A lack of capacity among commercially available laser cutting equipment manufacturers, given that these are often large, slower-moving companies with rigid business systems, legacy technology, long lead times, and high prices.

"We're cutting much faster than any other machine in the industry. We've been told we're doing things with fiber lasers that have never been done before from a speed/quality perspective."

Joe Kempf,
Alpine Laser's Founder and Commercial Leader

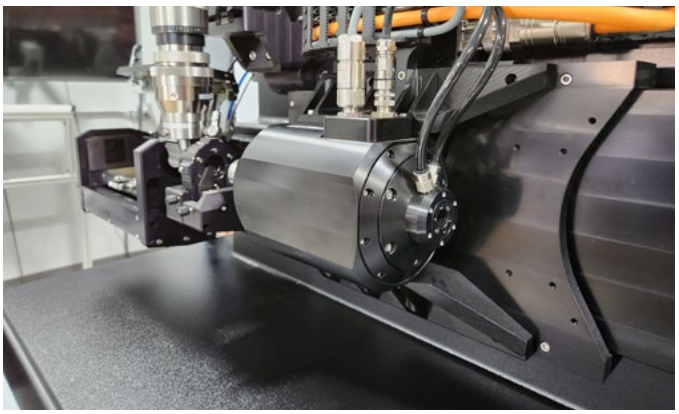
Historically, companies in the medical device industry would adapt general-purpose machines to cut medical tubing, but the tuning process would leave a performance-reducing margin of error. Alpine Laser was well-positioned to improve upon this situation. "We are a group of people with backgrounds in industrial machine design, high-volume medical manufacturing, and the medical device/therapy space, says Joe Kempf, Alpine Laser's Founder and Commercial Leader. "We deeply understand the needs of the customer and the market."

Considerations in developing world's most advanced medical tube cutting platform

The goal of the project was to build a specialized laser cutting platform for medical tube cutting that significantly improved machine setup time, cut speed, cut quality, reliability, ease of use, ergonomics, price, and lead time. The adaptation of generic cutting systems to something that could "do the job" always limited the total output of the system. Alpine sought to eliminate this error by using the most advanced controls technology coupled with flexible, modular tooling and fixtures.

At the outset, the team focused on a handful of objectives, including the following:

1. Improving throughput relative to the nearest competitor by a factor of two.
2. Reducing tool changeover time to less than five minutes.
3. Developing a product that easily modified to include several configuration options.
4. Ensuring CAT III safety to mitigate risk.
5. Designing a machine that can be easily serviced and maintained to offer the most uptime possible.



Developing a specialized laser tube cutting platform with a defined set of standardized options and configurations would allow Alpine Laser to do extensive up-front engineering, hold inventory, and pre-build machines, which in turn would minimize lead time, lower costs, and improve performance. Customers would be able to scale production by adding capacity of like-for-like equipment quickly and cost-effectively. "Our hyper-focused design concept was built around the principles of configurability, safety, serviceability, and scalability," says Kempf

Developing a configurable, serviceable, and scalable machine with Omron technologies

The Medicut Pro features an advanced motion control platform from Omron with near-limitless access to tuning parameters coupled with high-speed remote I/O modules. This allows Alpine to build high-performance workstations in a very efficient and economical way. The fact that the Medicut Pro can be used for prototyping as well as production gives customers the ability to quickly introduce new products and design into the market and leverage time spent prototyping into production.

In partnering with Omron, Alpine was able to implement what is arguably the most advanced motion control platform in the world over one of the fastest control layer networks. The scalability and openness of the architecture allowed the company to meet — and in many cases exceed — their objectives with respect to throughput, configurability, scalability, and other key criteria. The openness and interoperability of the Omron technologies gave Alpine the latitude to interface with other components that are not part of the Omron offering.

The Medicut Pro's serviceability is greatly enhanced by the fact that its control architecture is designed for ease of service and quick replacement in the unlikely event of failure. The Omron support team made sure that Alpine followed best practices in developing the laser processing

The value of Omron control technologies

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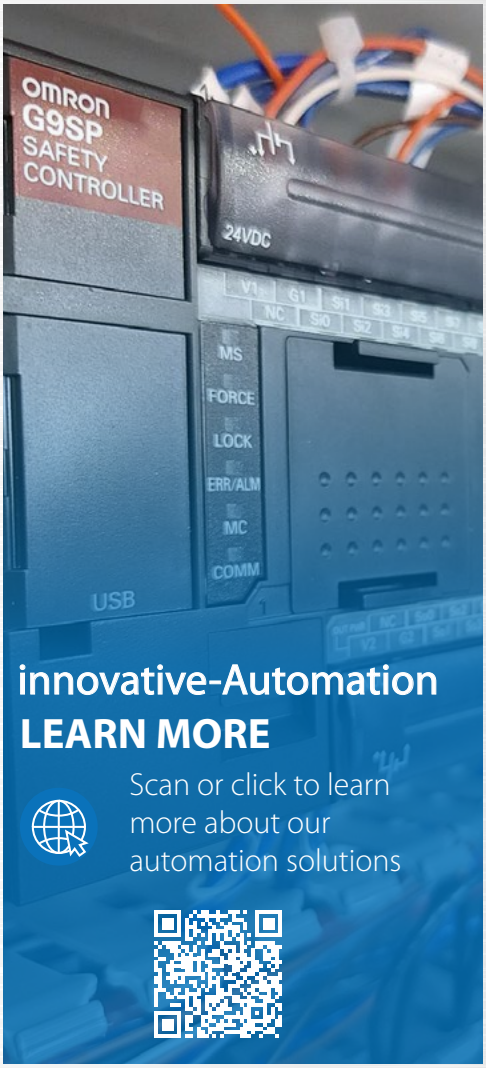

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The essential role of Omron's advanced motion engineering support

To assist customers who are developing a new product or application, Omron provides detailed support that includes onsite collaboration, application notes, phone and web conferences, and more from its field engineering teams. Omron worked directly with Alpine Laser from the very beginning of the project, sharing expert knowledge with and providing valuable motion engineering services that reduced time-to-market.

"The advanced motion engineering team was instrumental in supporting and training our engineering team to significantly shorten our time-to-market. Their ability to quickly and precisely answer questions is second to none," says Kempf. This support helped Alpine's engineers consider how each desired feature would make a difference in the end user's experience.

Beating all the odds: The stellar results of "hyper-focusing" and a valuable partnership

The results are in! Alpine Laser is the first-to-market with a purpose-driven machine for the medical tube industry in the United States, and it is the highest-throughput, most flexible tube cutting system that the industry has ever seen. "We're cutting much faster than any other machine in the industry," says Kempf. "We've been told we're doing things with fiber lasers that have never been done before from a speed/quality perspective."

End users can benefit from a modular design that makes the Medicut Pro easy to maintain, as well as a higher speed-to-production with high configurability, industry-standard communication platforms (EtherNet/IP and EtherCAT), and standard products from well-known component suppliers like Omron.

In comparison with the competition, the Medicut Pro is:

- faster (2-5x benchmarks from competition),
- more accurate (the Precision Regrip Module has less than .0005" positional error),
- more adaptable (three- to five-minute tool changeover and rapid prototyping),
- safer (CAT III safety system), and
- more serviceable (off-the-shelf products that Alpine stocks)

With cut speeds benchmarked at 2-5X the competition, a regrip function at .0005", and cut quality being as good as or better than anything else in the industry, the Medicut Pro is poised to advance the industry for years to come. As Omron continues to release new automation products, Alpine will be able to upgrade the Medicut Pro and release new laser processing technologies in tandem

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