The Experts in Laser Wire Stripping

Company Overview
The Experts In Laser Wire Stripping

From medical devices to jumbo jets, today’s technological world is full of electronics and interconnecting wires. A good fraction of these wires are made from exotic materials and with complex constructions, making them difficult or impossible to prepare for connection using conventional tools.

We use our deep knowledge of lasers and optics to deliver innovative technical solutions. You will find flexibility, not only in the way we work, but built into our products to give you the greatest competitive edge. From off-the-shelf bench-top systems to fully automated custom machines — we have the solution for you.

In 2016, Laser Wire Solutions and Schleuniger agreed to co-operate on a world-wide basis. Together we are developing laser based products, leveraging Schleuniger’s world leading position for mechanical stripper design, and their extensive global sales and support network. Together, by focusing on lasers and wire — we can give you the right solution fast.
Why use laser wire stripping? Laser Wire Stripping is used to strip wires where conventional means (primarily mechanical) are not possible. Laser stripping is intrinsically high precision and achieves unrivalled quality.

How does it work? The laser radiation is strongly absorbed by the wire insulation immediately vaporising it. The conductor or shield is highly reflective meaning that there is no conductor damage and the stripping stops once all the insulation is removed down to the conductor / shield. To cut shields, different types of laser are used which are strongly absorbed by the metal shield but not by the underlying dielectric.

Why invest?

*Increasing your manufacturing capability* with new products & processes; *bring an existing laser stripping process in house to drive down costs*; improve existing processes in terms of quality and/or productivity; use the technology to *push the envelope in terms of your innovative product design*.
Which types of wires benefit from laser stripping?

- **Small wires** where mechanical tools no longer cope—typically below 56-36 AWG.
- **Wires** with bonded insulation - e.g. polyimide / enamel coated magnet wire.
- **Windows**—the laser can generate a window cut easily where mechanical solutions struggle.
- **Out of round cables**—blades and dies cannot be used. **Tough insulations**.
- **Small shielded cables**—**microcoax**, especially when ribbonised.
- **High value, high precision medical devices** and cabling such as ultrasound cables, RF ablation catheters or pacemaker electrodes.
- **When strip quality is paramount**—no nicks, no damage, no residue.
- **Complex strip patterns** where other means are impossible.

**Is it safe?** The laser radiation is completely enclosed in a laser-safe housing in the same way that a CD or DVD player is—making it safe for use on the shop floor. Potentially harmful fumes are extracted and filtered by a HEPA and carbon filter to make the air safe for return to the factory. All our equipment meets and exceeds UL, OSHA and EU legislation.

**How is the machine used?** We offer both semi-automatic machines that strip wire ends, and fully automatic machines that take wire from spools and after stripping either re-spool the wire, or cut it to length.

**Will it work for me?** See the “The Way We Work” section to find out how we can help you technically evaluate your cable and build your ROI.
Standard Polymer Insulation Wire Stripping

The Mercury range of wire strippers feature industry standard Carbon Dioxide laser technology. Ideal for stripping jackets and dielectrics due to the strong absorption by the insulation and complete reflection by the conductor or shield. Available in single axis, dual axis and high speed ablation models, Mercury is an ideal work-horse for general stripping of single conductors, coax, FFCs, ribbon jackets and dielectrics.
Our Mercury systems can be used with industry standard cut-to-length systems to make a fully automated laser stripping system. Swap to manual mode when needed for maximum flexibility. Here our workhorse Mercury-2 is coupled with a Schleuniger EcoCut system.
The Gemini range of wire strippers are targeted at the removal of shields. Typical applications are bonded foil shields and fine gage wire used in the shielding of micro-coax.

The Gemini is a standalone bench top system. Used in conjunction with a Mercury jacket and dielectric stripper, the Gemini gives a complete solution for micro-coax stripping.

Micro-coax ribbons are popular applications for Mercury (jacket and dielectric) and Gemini (shield) systems.

In a typical Gemini system, the shield is tinned to form a single solid mass. The Gemini laser scribes a thin line within the tinned shield. This allows it to be easily snapped. It is an analogous process to scribing a sheet of glass with a diamond tipped tool.
Laser Wire Solutions have unique capabilities when it comes to the cutting of InfiniBand data cable foil shields. We are able to produce perfect, accurate cuts with no flags and no damage to the underlying layers.
Precision Wire Stripping

Polyimide coated magnet wire is prized for its low cross section, flexibility and temperature handling characteristics. Critical medical, space and defence applications, such as catheter wiring, require precision stripping only possible with the Odyssey system. Strip wire ends or windows with micron precision in two axes and laser cut the wire conductor within the same system. Enamelled (magnet) wire is used in an almost endless list of applications. Laser stripping is preferred where quality, throughput or complex strip patterns are required.

The Odyssey systems are well suited for stripping a wide range of medical wiring used in Electrophysiology.
Window strips in a medical catheter quad ribbon cable

The same precision laser technology can be used for stripping and cutting of the wire giving unprecedented strip length control.
Machine Types

The Mercury, Gemini and Odyssey laser processes are selected depending on the wire types to be stripped. Each type has its own application specialities. We offer a range of off-the-shelf machines that incorporate the laser processes. The most popular ranges 2 series and 4 series are available in all three laser process types. The choice of 2 series or 4 series mainly depends on the strip area requirements and processing needs. Please contact us for detailed assistance in choosing the right laser / machine combination.

2 series

The 2 series, available as a Mercury-2, Gemini-2 or Odyssey-2 system, are best suited where a number of cables need to be stripped in one process. Cables are loaded onto a large fixture with a 125mm (4.9”) x 175mm (6.9”) working area. The machine moves the laser spot in 2 axes allowing end strips, slits and windows. Maximum speed of 250mm/s (9.8”/s) as standard.
The 4 series is also available as a Mercury-4, Gemini-4 or Odyssey-4. This smaller footprint unit is suited for standalone use or integrated into a production line. The high speed scanner technology allows beam speeds up to 2000mm/s (80”/s) in a reduced 50mm x 50mm (2”x2”) working area. The high beam speed means not only can the unit make end strips, slits and windows—it can also be used to vaporise areas of insulation where it makes sense for the material. A very flexible tooling arrangement allows single wire insertion—or use with slide in fixture plates as the 2 series.

All our systems can be used in-line with cut strip systems to make an automated stripping and cutting solution.
Custom Solutions

Sometimes the off-the-shelf solution will just not do. At Laser Wire Solutions we pride ourselves on our custom design and build capabilities. Whether a specially designed cable fixture for a standard machine or a full ground up machine design we are ready and able to give you exactly what you need.

Case Study

Medical catheter wiring requires the most precise stripping. We were approached by an OEM needing to make individual windows in a quad 42 AWG ribbon. Despite each wire being 0.1mm (0.004”) in diameter, it was necessary to strip and cut each individually —with no damage to the neighbouring wires. The Odyssey-1 was developed specifically for this application and is fully automatic with in-built vision system control.

< Custom fixture

Laser Cut and Stripped Quad Wire >
In processing the next generation of ultra-flexible medical coax cables, every effort is being made to minimise the amount of shield wires. We were approached to develop a unique process for the damage-free cutting of fine serve wires on a next-generation data cable. Collaborating with the client, together we tweaked the cable design and laser process to achieve consistent results before putting together a custom fully automatic coax-ribbon prep system — the Titan 1 — packed with process control features such as cameras, power stabilisation and beam spot monitoring.
New Capabilities

In addition to our continuous development of new products we are also adding new capabilities above and beyond laser wire stripping.

Medical Part Marking

The Odyssey laser stripping process can also be used for marking certain medical grade plastics. The ultra-short pulsed UV laser creates a distinct surface mark on many plastics. Our systems the important validation tools to enable the marking process to be qualified for FDA / CE approval.

Laser Micro-Soldering

Utilising an advanced micro-plating technology we are able to micro-solder wires as small as 46 AWG, for instance in the creation of microscopically small (thermocouple junctions for medical sensing applications.
New Products

Innovation is our watchword and we continually strive to develop new capabilities and solutions for our customers that improve product quality, reduce cycle time, reduce scrap and reduce RSI.

Semi-Rigid Dielectrics

The complex shapes of pre-formed semi-rigid cables have always proved an issue with laser strippers due to complexity in fixturing. A new fixturing solution for the Mercury-4 allows most semi-rigid cables to be stripped with a single universal holder.

View showing the removeable tool slide-out of the fixture holder. The tool slides out to allow the rotary selector to be turned. The tool has a single entry port to fit the biggest cable OD. A sprung gripper (normally closed) has a vee end profile and grips the cable when released.

To load, the toggle clamp is pushed down which first releases the gripper and then pushes the selector forwards.
Mercury-5 Large Gauge Stripper

The Mercury-5 bench-top laser wire stripper identifies a gap in the market for an affordable laser method of stripping large gauge wires, especially outer jackets of high voltage cables. It strips single conductor cables with outer diameters ranging between 0.24” (6 mm) and 0.79” (0.79 mm) and up to 11” (280 mm) strip length.

It grips, strips and releases the cable with a unique auto-focusing system that enables speed and repeatability. An automatic cable centralizer ensures excellent quality and zero change-over time.
Mercury-6 Rotary Stripper

The Mercury-6 is a powerful benchtop unit customized for stripping of multi-layer cables (such as Coroplast high voltage automotive cables) up to an outer diameter of 1.18” (30mm). 2D optics system features linear and rotary axes for circumference cut and length slit up to 7.9” (200mm). It not only strips the outer insulation, but also cuts the inner Mylar foil shield.

Independent, auto-focus allows for changes in cable diameter at the push of a button. A unique cable end finding system ensures that accurate wire lengths are processed. A self-limiting laser process means that a wide range of wires and cables can be stripped in a single machine with the same set-up.
Mercury-4E

The Mercury-4E is an extended version of the extremely popular Mercury-4 laser wire stripper. It remains a relatively compact bench-top unit, but provides a processing area of 4” (100 mm) x 4” (100 mm) to allow a greater quantity of cables to be processed at one time.

It is fast and flexible. It can strip single conductor, coax and ribbons at a speed of up to 80” (2000 mm) per second. A dual (X & Y) axis motion means that it can handle all strip types: cross-cut, windows and area ablation; as well as any shapes: curves and hatched areas, not just straight lines.

The system is easy to use. The operator selects via touchscreen the desired stripping program from the pre-programmed library and all parameters (strip lengths, laser power and speed, etc) are automatically set.

An inbuilt camera allows the whole stripping process to be monitored and in-line stripping operation is also available.
Gemini-6 Foil Shield & Metal Tube Cutter

The Gemini-6 is a high performance fiber laser machine for cutting metallic tubular shields, such as that seen in high temperature sensors, thermocouples and RF / microwave connections.

The laser cuts around the circumference as well as along the part. Up to 0.04” (1mm) wall thickness stainless steel can be cut in parts from 0.04” (1mm) to 0.4” (10mm) outside diameter and up to 4” (100mm) slitting length.

A custom control system allows simple programming of strip length, strip speed and number of passes. An unlimited number of process recipes can be stored and retrieved via a colour touchscreen.
Odyssey-4

The award-winning, high precision and extremely compact Odyssey-4 system has been especially designed for the gentle ablation of polyimide wire (e.g. enamel coated catheter electrodes and thermocouples) down to 58 AWG.

Featuring ultra-violet laser technology, the Odyssey-4 vaporizes any insulation cleanly and precisely, whilst harmlessly reflecting from the shield or conductor, giving a perfect, nick-free strip every time. Unlike competing laser technologies no residue is left, so it is possible to connect to the wire without further chemical treatment.

Odyssey-4 Inline

For the optimum in productivity the Odyssey-4 can be coupled with a precision wire transport system that allows wires to be stripped in a spool to spool arrangement, with zero operator input so that you can get the most from your Odyssey laser wire stripping technology.

The optional advanced vision system allows monitoring for peace of mind and product validation.
Odyssey-7 Foil Cutter

This is a specialised UV 4-beam laser system designed to obtain the best 360 degree strip. The light is directed sequentially between the top and bottom nozzles by a shuttle mirror. Each nozzle has an independent focus which can be programmed to ensure the best possible process.

This is the ideal solution for foil stripping and twin-ax and micro-coax shield stripping. It features a compact design and is easy to use with touchscreen control and storage capacity of up to 99 pre-programmed stripping recipes.
Contract Manufacturing

Laser Wire Solutions’ wire stripping service allows you to access the highest performance stripping that our products afford - without having to make any capital investments.

We offer 2 main services:

**Manual:** Stripping of the widest range of wire types on stand-alone strippers. Ideal for small runs of a few hundred or thousand pieces.

**Automatic:** fully automatic stripping of enamelled wire (polyimide. ML, kapton etc.). Both strip & cut and strip & re-reel services available. Batch sizes up to millions of feet per year are easily accommodated.
Ramp up your production

It is common to require laser stripping from the beginning of a new project. At this stage, budgets do not exist for capital investment and production volumes are low. However, it is necessary to utilise the same technology as will be used in mass-production. By using our laser stripping service, you have the peace of mind of accessing the world’s best stripping solutions from day one. In addition, as volumes increase, we can keep pace with your needs, or you can invest in your own system when volumes justify it.

Features & Benefits

**Peace of mind:** let our team of laser physicists find the optimal solution for your wire. Access the best wire stripping technology available on day one of your project, and know you can use the same process for ramped up volume—whether outsourced or with your own machine.

**Highest quality:** laser stripping tailored to your stripping requirement—no nicks guaranteed.

**Cost effective:** pay per wire—so no up-front investment. High volume discounts.

**Fast:** short turnarounds.

**Versatile:** solutions for the vast majority of wire types.
We have developed a process to support you from initial contact through to full production and beyond... 

**Collect Requirements**
Initial enquiry—collect information on cable materials, stripping requirements, target process times etc.

**Identify Solution**
Select the most appropriate laser solution including source and beam delivery.

**Free Capability Sample**
Produce a free sample to demonstrate stripping capability and determine the optimum process parameters.

**Continuous Support**
We will continue to support your equipment and process throughout the warranty and beyond.

**Production Ramp Up**
Ship & install machine and support production ramp up by providing process support.
For simple projects — directly produce system quote including data to support ROI and Cap-Ex.

Complex projects may require multiple iterations of sampling and even material development. Our highly skilled Laser Physicists will work with you to reach your goals. This usually involves a number of days of paid for lab work.

Early stage projects often cannot justify a capital purchase. We can support you by manufacturing small volumes under contract — to achieve FDA approval for example. We can continue with contract manufacture as volumes increase until you are ready to bring the manufacture in house.
We serve the global market, both directly and through the local Schleuniger sales network. All of our products comply with the latest US and European safety standards.

For a full list of international contacts visit us at www.laserwiresolutions.com.